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Brocade VDX 6720

Hardware Reference Manual

Supporting the Brocade VDX 6720-24 and Brocade VDX 6720-60

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Brocade Communications Systems, Incorporated

Corporate and Latin American Headquarters
Brocade Communications Systems, Inc.
130 Holger Way
San Jose, CA 95134
Tel: 1-408-333-8000
Fax: 1-408-333-8101
E-mail: info@brocade.com

Asia-Pacific Headquarters
Brocade Communications Systems China HK, Ltd.
No. 1 Guanghua Road
Chao Yang District
Units 2718 and 2818
Beijing 100020, China
Tel: +8610 6588 8888
Fax: +8610 6588 9999
E-mail: china-info@brocade.com

European Headquarters
Brocade Communications Switzerland Sàrl
Centre Swissair
Tour B - 4ème étage
29, Route de l'Aéroport
Case Postale 105
CH-1215 Genève 15
Switzerland
Tel: +41 22 799 5640
Fax: +41 22 799 5641
E-mail: emea-info@brocade.com

Asia-Pacific Headquarters
Brocade Communications Systems Co., Ltd. (Shenzhen WFOE)
Citic Plaza
No. 233 Tian He Road North
Unit 1308 – 13th Floor
Guangzhou, China
Tel: +8620 3891 2000
Fax: +8620 3891 2111
E-mail: china-info@brocade.com

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Brocade VDX 6720 Hardware Reference Manual	*53-1002084-02*	Added China class A statement	June 2011
Brocade VDX 6720 Hardware Reference Manual	*53-1002084-03*	Added Canadian French translation of compliance statement. Serial cable pinouts have been added.	February 2012
Brocade VDX 6720 Hardware Reference Manual	*53-1002084-04*	Serial cable pinout diagram has been corrected.	March 2012
Brocade VDX 6720 Hardware Reference Manual	*53-1002084-05*	Management options revised. New CCC statement updated	May 2012
Brocade VDX 6720 Hardware Reference Manual	*53-1002084-06*	Optical port LED patterns and physical dimensions table updated	August 2013

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How this document is organized

This document is organized to help you find the information that you want as quickly and easily as possible.

The document contains the following components:

- Chapter 1, "Brocade VDX 6720 Introduction" provides an overview of the Brocade VDX 6720 switch.
- Chapter 2, "Brocade VDX 6720 Installation" provides the information needed to install the switch into your network.
- Chapter 3, "Brocade VDX 6720 Configuration" lays out the tasks and commands necessary to get the switch up and running.
- Chapter 4, "Brocade VDX 6720 Operation" discusses the day-to-day operational procedures for using the switch.
- Chapter 5, "FRU Removal and Replacement Procedures" provides procedures for removing and replacing the field-replaceable units (FRUs), including the fan assemblies and power supplies.
- Appendix A, "Brocade VDX 6720 Specifications" provides tables of physical, environmental, and general specifications.

Supported hardware and software

This document is specific to the Brocade VDX 6720-24 and the Brocade VDX 6720-60 under Network OS v2.0.0 and later.

What's new in this document

The following changes have been made since this document was last released:

- The numbering scheme for the front views of the switches has been corrected. "Views of the Brocade VDX 6720-24 switch" and "Views of the Brocade VDX 6720-60 switch."
- The LED patterns for the optical SFP ports have been updated. "LED patterns."
- Physical dimensions of the switch have been updated. "Weight and physical dimensions."
- Setting a static IP address has been updated. "Setting the switch IP address."
- Ethernet hub connections information has been corrected. "Connecting to Ethernet or fast Ethernet hubs."

Document conventions

This section describes text formatting conventions and important notice formats used in this document.

Text formatting

The narrative-text formatting conventions that are used are as follows:

bold text	Identifies command names Identifies the names of user-manipulated GUI elements Identifies keywords and operands Identifies text to enter at the GUI or CLI
italic text	Provides emphasis Identifies variables Identifies paths and Internet addresses Identifies document titles
`code` text	Identifies CLI output Identifies command syntax examples

For readability, command names in the narrative portions of this guide are presented in mixed lettercase: for example, **show media**. In actual examples, command lettercase is often all lowercase. Otherwise, this manual specifically notes those cases in which a command is case sensitive.

Command syntax conventions

Command syntax in this manual follows these conventions:

command	Commands are printed in bold.
--**option, option**	Command options are printed in bold.
-**argument,** arg	Arguments.
[ ]	Optional element.

variable	Variables are printed in italics. In the help pages, values are underlined or enclosed in angled brackets < >.
...	Repeat the previous element, for example “member[;member...]”
value	Fixed values following arguments are printed in plain font. For example, **--show** WWN
|	Boolean. Elements are exclusive. Example: **--show -mode** egress | ingress

Notes, cautions, and warnings

The following notices and statements are used in this manual. They are listed below in order of increasing severity of potential hazards.

NOTE
A note provides a tip, guidance or advice, emphasizes important information, or provides a reference to related information.

ATTENTION
An Attention statement indicates potential damage to hardware or data.

CAUTION

A Caution statement alerts you to situations that can be potentially hazardous to you.

DANGER

A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Key terms

For definitions specific to Brocade and Fibre Channel, see the *Brocade Glossary*.

For definitions of SAN-specific terms, visit the Storage Networking Industry Association online dictionary at:

http://www.snia.org/education/dictionary

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Red Hat, Inc.	Red Hat, Red Hat Network, Maximum RPM, Linux Undercover
Velcro Industries B.V.	Velcro

Additional information

This section lists additional Brocade and industry-specific documentation that you might find helpful.

Brocade resources

To get up-to-the-minute information, go to *http://my.brocade.com* to register at no cost for a user ID and password.

For practical discussions about SAN design, implementation, and maintenance, you can obtain *Building SANs with Brocade Fabric Switches* through:

http://www.amazon.com

White papers, online demos, and data sheets are available through the Brocade Web site at:

http://www.brocade.com/products-solutions/products/index.page

For additional Brocade documentation, visit the Brocade Web site:

http://www.brocade.com

Release notes are available on the MyBrocade web site and are also bundled with the Network OS firmware.

Other industry resources

For additional resource information, visit the Technical Committee T11 Web site. This Web site provides interface standards for high-performance and mass storage applications for Fibre Channel, storage management, and other applications:

http://www.t11.org

For information about the Fibre Channel industry, visit the Fibre Channel Industry Association Web site:

http://www.fibrechannel.org

Getting technical help

Contact your switch support supplier for hardware, firmware, and software support, including product repairs and part ordering. To expedite your call, have the following information available:

1. General Information
    - Switch model
    - Switch operating system version
    - Error numbers and messages received
    - Support save output
    - Detailed description of the problem, including the switch or fabric behavior immediately following the problem, and specific questions
    - Description of any troubleshooting steps already performed and the results
    - Serial console and Telnet session logs
    - syslog message logs
2. Switch Serial Number

    The switch serial number and corresponding bar code are provided on the serial number label, as illustrated below.:

    The serial number label is located as follows:

    - Brocade VDX 6720 — On the switch ID pull-out tab located on the bottom of the port side of the switch

Document feedback

Quality is our first concern at Brocade and we have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission, or you think that a topic needs further development, we want to hear from you. Forward your feedback to:

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Provide the title and version number of the document and as much detail as possible about your comment, including the topic heading and page number and your suggestions for improvement.

Chapter

Brocade VDX 6720 Introduction

1

In this chapter

- Brocade VDX 6720 overview 1
- Views of the Brocade VDX 6720-24 switch 4
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Brocade VDX 6720 overview

The Brocade VDX 6720 switches are a pair of 10 Gigabit Ethernet (GbE) line-rate, low latency, lossless Data Center Bridging (DCB) switches: the Brocade VDX 6720-24 (a 24-port, single-height switch) and the Brocade VDX 6720-60 (a 60-port, double-height switch).The Brocade VDX 6720 run on the Brocade Network Operating System (Network OS) v2.0.0 or later. For details about Network OS, refer to the *Brocade Network OS Administrator's Guide*.

The Brocade VDX 6720 switches offer Ports on Demand (POD) licensing. Base models of the switches contain 16 Ethernet ports (for the Brocade VDX 6720-24) or 40 Ethernet ports (for the Brocade VDX 6720-60). Additional ports can be licensed by way of POD. One POD license on the Brocade VDX 6720-24 allows an additional 8 ports to be activated. For the Brocade VDX 6720-60, two POD licenses (for 10 ports each) can be purchased.

A key feature of the Brocade VDX 6720 switches is Brocade VCS™ technology, which includes virtual cluster switching, a new set of technologies that allows users to create flatter, virtualized, and converged data center networks. VCS fabrics are scalable, permitting users to expand at their own pace, and simplified, allowing users to manage the fabric as a single entity. VCS-based Ethernet fabrics are convergence-capable, with technologies such as Fibre Channel over Ethernet (FCoE) for storage.

Platform components and capabilities

The Brocade VDX 6720 switches offer the following features and capabilities:

- A system motherboard that features a Reduced Instruction Set Computer (RISC) CPU running at 1.3 GHz with integrated peripherals
- An RJ45 10/100/1000 Ethernet out-of-band management port
- An RJ45-fronted serial (RS-232) port for terminal access and debugging
- A USB port for firmware upgrades and system log downloads
- Support for long-range and short-range SFP+ GbE transceivers
- Support for optical cables and active twin axial (twinax) copper cables
- Support for direct-attach copper cables

- Support for inter-switch link (ISL) trunking
  - Frame-level hardware-based trunking (even distribution of frames across trunk links)
- A reduced-depth, rack-mount design using existing rail kits (fixed, mid-mount, or Telco rack mount kits
- Extensive diagnostics and system-monitoring capabilities for enhanced high Reliability, Availability, and Serviceability (RAS)
- Optimized airflow (a choice of front-to-back or back-to-front flow)
- A real-time clock (RTC) with battery
- SEEPROM for switch identification
- Voltage monitoring
- Fan monitoring
- Three temperature sensors
- I^2C interface to monitor and control environmental aspects

NOTE
Port numbering for the Brocade VDX 6720 begins with 1, not 0.

VDX 6720-24 features

Features specific to the Brocade VDX 6720-24 include:

- 1U form factor enclosure
- 16 10 GbE SFP+ ports (also configurable to 1 GbE) with 8 additional 10 GbE ports available for a total of 24
- One forwarding ASIC
- 600 nanosecond (ns) port-to-port latency
- 15-inch depth
- Dual, hot-swappable 250W AC power supplies with three integrated cooling fans each

VDX 6720-60 features

Features specific to the Brocade VDX 6720-60 include:

- 2U form factor enclosure
- 40 10 GbE SFP+ ports (also configurable to 1 GbE) with 20 additional 10 GbE ports available for a total of 60
- Nine forwarding ASICs arranged in a 3/6, core/edge configuration
- One forwarding FC ASIC
- 600 ns port-to-port latency, 1.8µs across port groups
- 17-inch depth
- Dual, redundant, hot-swappable 500W AC power supplies
- Triple, hot-swappable cooling fans in an n+1 configuration

Software features

The Brocade VDX 6720 switches support the following features. For more details on these features, refer to the *Brocade Network OS Administrator's Guide*.

Layer 2 and Layer 3 security features

- VLANs
- Spanning Tree Protocol (STP, RSTP, MSTP and PVST+ and PVRST+)
- Support for unicast and multicast capabilities
- Support for IGMP snooping
- Layer 2 multi-path based on Transparent Interconnection of Lots of Links (TRILL)
- Layer 2 access control lists (ACLs)
- Switch Port Analyzer (SPAN) (also known as port mirroring)

Virtualization

- Automatic Migration of Port Profiles (AMPP)
- Support for VLAN, QoS, security, and FCoE port profiles

Convergence/FCoE

- Pause Frames (Tx and Rx)
- DCB features such as Priority Flow Control (PFC) and Enhanced Transmission Selection (ETS)
- End-to-end, multi-hop FCoE

Link aggregration

- 802.3ad LACP support
- Virtual Link Aggregation Group (vLAG) (a LAG that spans multiple physical switches)

QoS

- 802.1p marking
- Scheduling: Strict priority (SP), Shaped Deficit Weighted Round-Robin (SDWRR)

Management

- IPv4 or IPv6 management
- CLI management utilities on Network OS v2.0.0
- Out-of-band management (standalone mode)
- sFlow
- TRILL Operations, Administration, and Management (OAM)

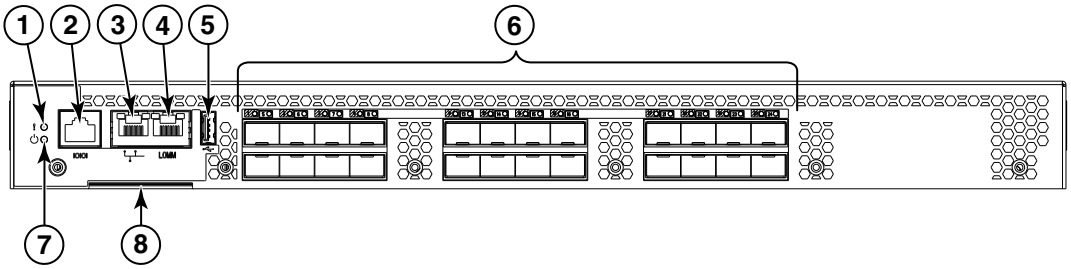
Licensing

- VCS licensing: Available multi-node license up to 24 nodes (enables Ethernet Fabric functionality)
- Ports on Demand (POD):
  - Single POD license for 8 ports on Brocade VDX 6720-24
  - Two POD licenses for 10 ports each on Brocade VDX 6720-60
- FCoE licensing (enables FCoE Forwarding and FCoE to FC Bridging)

Views of the Brocade VDX 6720-24 switch

The port side of the Brocade VDX 6720-24 switch includes the system LEDs, management ports and LEDs, USB port, and Gigabit Ethernet (GbE) ports and the corresponding port status LEDs.

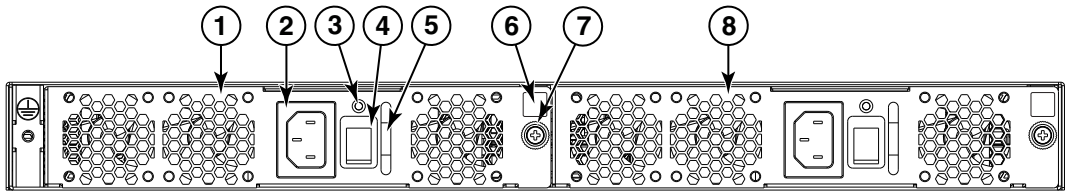
Figure 1 shows the port side of the Brocade VDX 6720-24.



1	System status LED	5	USB port
2	Serial console port (RJ45)	6	10 GbE ports 1 through 24 with status LEDs above
3	Ethernet management port (RJ45)	7	System power LED
4	RLO management port (RJ45)	8	Switch ID pull-out tab

FIGURE 1 Port side view of the Brocade VDX 6720-24

Figure 2 shows the non-port side of the Brocade VDX 6720-24, which contains the combined power supply and fan assemblies.



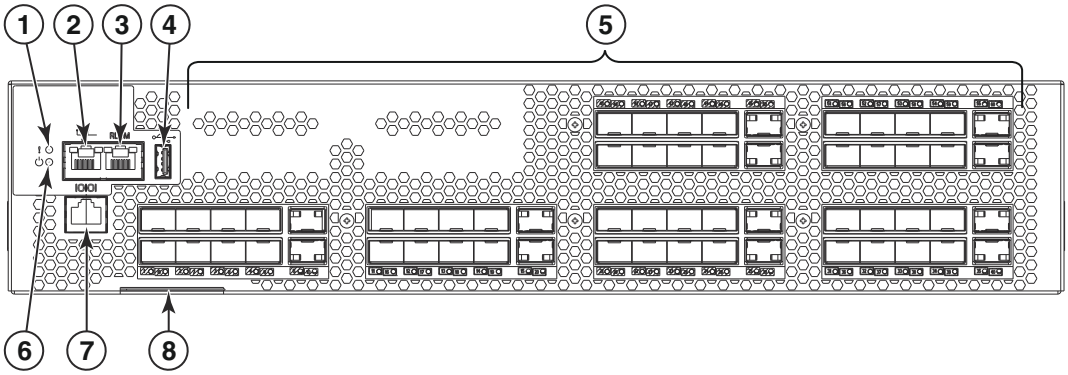
1	Power supply and fan assemby #2	5	Handle
2	Power cord receptacle	6	Airflow label
3	Power supply and fan status LED	7	Captive screw
4	On/off switch	8	Power supply and fan assembly #1

FIGURE 2 Non-port side view of the Brocade VDX 6720-24

Views of the Brocade VDX 6720-60 switch

The port side of the Brocade VDX 6720-60 switch includes the system LEDs, management ports and LEDs, USB port, and Gigabit Ethernet (GbE) ports and the corresponding port status LEDs.

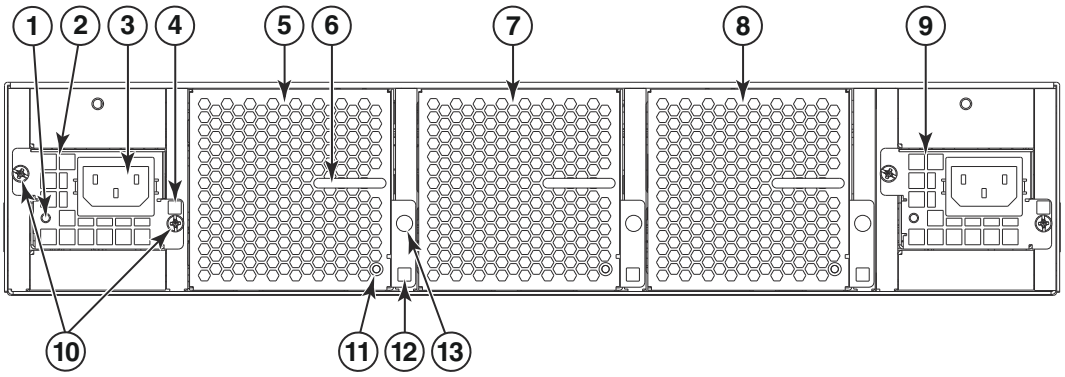
Figure 3 shows the port side of the Brocade VDX 6720-60.



1	System status LED	5	10 GbE ports 1 through 60 with status LEDs above and below
2	Ethernet management port (RJ45)	6	System power LED
3	RLO management port (RJ45)	7	Serial console port (RJ45)
4	USB port	8	Switch ID pull-out tab

FIGURE 3 Port side view of the Brocade VDX 6720-60

Figure 4 shows the non-port side of the Brocade VDX 6720-60, which contains the power supplies and cooling fan assemblies.



1	Power supply status LED	8	Fan assembly #1
2	Power supply #2	9	Power supply #1
3	Power cord receptacle	10	Power supply captive screws
4	Power supply airflow label	11	Fan status LED
5	Fan assembly #3	12	Fan assembly airflow label
6	Fan handle	13	Fan captive screw
7	Fan assembly #2		

FIGURE 4 Non-port side view of the Brocade VDX 6720-60

Chapter

Brocade VDX 6720 Installation

2

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- Standalone installation for a Brocade VDX 6720 9
- Rack installation for a Brocade VDX 6720 10
- Providing power to the switch 10
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Items included with the Brocade VDX 6720 switches

The following items are included with the standard shipment of a fully-configured Brocade VDX 6720. When you open the Brocade VDX 6720 packaging, verify that the items are included in the package and that no damage has occurred during shipping:

- The Brocade VDX 6720 switch, either the 24-port or 60-port version
- One accessory kit, containing the following items:
  - Serial cable with an RJ45 connector
  - 6 ft. power cords (2)
  - Rubber feet, required for setting up the switch as a standalone unit
  - Brocade 2 GB USB memory device
  - *Brocade VDX 6720 QuickStart Guide*

Installation and safety considerations

You can install a Brocade VDX 6720 switch in the following ways:

- As a standalone unit on a flat surface.
- In an EIA cabinet using a four-post fixed-rail rack mount kit. The optional fixed-rail rack mount kit can be ordered from your switch retailer. Both the 24”-32” rack depth kit and the 28”-29” rack depth kit will work with the Brocade VDX 6720 switch.
- In a Telco rack using a flush mount rack kit for switches. The optional flush mount rack kit for switches can be ordered from your switch retailer.
- In a Telco rack using a mid-mount rack kit. The optional mid-mount rack kit for switches can be ordered from your switch retailer.
- In the iDataplex IBM 15.5-inch depth rack (requires an iDataplex rack mount kit), Brocade part number 60-1001519-01.

Electrical considerations

To install and operate the switch successfully, ensure compliance with the following requirements:

- The primary outlet is correctly wired, protected by a circuit breaker, and grounded in accordance with local electrical codes.
- The supply circuit, line fusing, and wire size are adequate, as specified by the electrical rating on the switch nameplate.
- The power supply standards are met. Refer to Table 11 on page 48 for more information.

Environmental considerations

For successful installation and operation of the switch, ensure that the following environmental requirements are met:

- Because the Brocade VDX 6720 switches can be ordered with fans that move air either front to back or back to front, be sure to orient your switch with the airflow pattern of any other devices in the rack. All equipment in the rack should force air in the same direction to avoid intake of exhaust air.
  - A maximum of 102 cubic meters/hour (60 cubic feet/minute) and a minimum of 74.8 cubic meters/hour (44 cubic feet/minute) of air flow is available to the air intake vents.
  - The ambient air temperature does not exceed 40° C (104° F) while the switch is operating.

Rack considerations

For successful installation and operation of the switch in a rack, ensure the following rack requirements are met:

- The rack must be a standard EIA rack.
- The rack space required is one or two rack units high depending on the switch ordered (1U for the Brocade VDX 6720-24 or 2U for the Brocade VDX 6720-60); 4.3 cm (1.7 in.) or 8.90 cm (3.50 in.) high and 42.9 cm (16.9 in.) wide.
- The equipment in the rack is grounded through a reliable branch circuit connection and maintains ground at all times. Do not rely on a secondary connection to a branch circuit, such as a power strip.
- Airflow and temperature requirements are met on an ongoing basis, particularly if the switch is installed in a closed or multirack assembly.
- The additional weight of the switch does not exceed the rack's weight limits or unbalance the rack in any way.
- The rack is secured to ensure stability in case of unexpected movement, such as an earthquake.

Recommendations for cable management

The minimum radius to which a 50 micron cable can be bent under full tensile load is 5.1 cm (2 in.). For a cable under no tensile load, that minimum is 3.0 cm (1.2 in.).

Cables can be organized and managed in a variety of ways; for example, use cable channels on the sides of the cabinet or patch panels to reduce the potential for tangling the cables. The following list provides some recommendations for cable management:

NOTE
You should not use tie wraps with optical cables because they are easily overtightened and can damage the optic fibers. Velcro-like wraps are recommended.

- Plan for the rack space required for cable management before installing the switch.
- Leave at least 1 m (3.28 ft) of slack for each port cable. This provides room to remove and replace the switch, allows for inadvertent movement of the rack, and helps prevent the cables from being bent to less than the minimum bend radius.
- For easier maintenance, label the cables and record the devices to which they are connected.
- Keep LEDs visible by routing port cables and other cables away from the LEDs.

Items required for installation

The following items are required for installing, configuring, and connecting the Brocade VDX 6720 switches for use in a network and fabric:

- A workstation with an installed terminal emulator, such as HyperTerminal.
- An unused IP address and corresponding subnet mask and gateway address.
- A serial cable (provided).
- An Ethernet cable.
- Brocade-branded SFP (1 GbE) or SFP+ (10 GbE) transceivers and compatible cables or direct-attach copper and optical cables.
- (Optional) Access to an FTP server or Brocade-branded USB device for backing up the switch configuration.
- If mounting in the iDataplex IBM 15.5-inch depth rack, the Brocade iDataplex rack mount kit.

Standalone installation for a Brocade VDX 6720

Complete the following steps to install the Brocade VDX 6720 as a standalone unit.

1. Unpack the Brocade VDX 6720 switch and verify the items listed in "Items included with the Brocade VDX 6720 switches" on page 7 are present and undamaged.
2. Apply the adhesive rubber feet. Applying the rubber feet to the switch helps prevent the switch from sliding off the supporting surface.
    a. Clean the indentations at each corner of the bottom of the switch to ensure that they are free of dust or other debris that might lessen the adhesion of the feet.
    b. With the adhesive side against the chassis, place one rubber foot in each indentation and press into place.
3. Place the switch on a flat, sturdy surface.
4. Provide power to the switch as described in "Providing power to the switch" on page 10.

ATTENTION
Do not connect the switch to the network until the IP address is correctly set. For instructions on how to set the IP address, see "Setting the switch IP address" on page 13.

Rack installation for a Brocade VDX 6720

Follow the installation instructions shipped with the appropriate rack mount kit:

- To install the switch into a 4-post fixed-rail rack, refer to the *Fixed Rack Mount Kit (24"-32") Installation Procedure* or the *Fixed Rack Mount Kit Installation Procedure.*
- To install the switch into a 2-post Telco rack, refer to the *Flush Mount Rack Mount Kit Installation Procedure*.

Providing power to the switch

Perform the following steps to provide power to the Brocade VDX 6720.

1. Connect the power cords to both power supplies, and then to power sources on *separate* circuits to protect against failure. Ensure that the power cords have a minimum service loop of 15.2 cm (6 in.) available and are routed to avoid stress.
2. Power on the Brocade VDX 6720-24 by turning both on/off switches to "**I**." The Brocade VDX 6720-60 powers up automatically when plugged in. The power supply LEDs display amber until POST is complete, and then change to green. The switch usually requires several minutes to boot and complete POST.

   ATTENTION
   Power is supplied to the switch as soon as the first power supply is connected and powered on.

3. After POST is complete, verify that the switch power and status LEDs on the left of the port side of the switch are green. Refer to Figure 1 on page 4 and Figure 3 on page 5 for the specific location of these LEDs.

Verifying operation

After you have powered the system on and POST is complete, verify that the switch is working properly.

1. Verify that the power supply LEDs are solid green. See Figure 6 on page 23 and Figure 9 on page 24 for the location of these LEDs.
2. Verify that the system power LED and the system status LED is solid green. See Figure 5 on page 22 and Figure 7 on page 23 for the specific locations of these LEDs.
3. The port LEDs should be lit during POST activities. When POST is complete, only the LEDs for ports connected to other devices should be green. See Figure 5 on page 22 and Figure 7 on page 23 for the specific locations of these LEDs.

See Table 3 on page 24 and Table 4 on page 25 for more details on the LED patterns.

Chapter

Brocade VDX 6720 Configuration

3

In this chapter

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Configuration modes for the Brocade VDX 6720

The Brocade VDX 6720 can be configured in either standalone mode or VCS™ mode.

In standalone mode, the switch acts as an Ethernet switch, receiving and transmitting packets like any independent switch. It is configured and managed independently.

In VCS mode, the switch is part of an Ethernet fabric involving two or more VCS-enabled switches. VCS technology embodies the concepts of distributed intelligence and logical chassis. Distributed intelligence means that all configuration and destination information is automatically distributed to each member switch in the fabric. Distributed intelligence has three major characteristics:

- The fabric is self-forming. When two VCS-enabled switches are connected, the fabric is automatically created and the switches discover the common fabric configuration.
- The fabric is masterless. No single switch stores configuration information or controls fabric operations. Any switch can fail or be removed without causing disruptive fabric downtime or delayed traffic.
- The fabric is aware of all members, devices, and Virtual Machines (VMs). Automatic Migration of Port Profiles (AMPP) supports VM migration to another physical server. If the VM moves, it is automatically reconnected to all of its original resources.

Logical chassis means that the entire VCS fabric appears and can be managed as a single Layer 2 switch. There are three major characteristics to logical chassis:

- Each physical switch in the fabric can be managed as if it were a blade in a chassis. When a VCS-enabled switch is connected to the fabric, it inherits the configuration of the fabric and the new ports become available immediately.
- You can manage the entire fabric from any switch.
- You can manage the edge switches in the fabric as if they were a single switch.

Creating a serial connection

You perform all configuration tasks in this guide using a serial connection from a workstation or terminal to the switch.

Complete the following steps to create a serial connection to the switch.

1. Connect the serial cable to the serial port on the switch and to an RS-232 serial port on the workstation or terminal device.

   If the serial port on the workstation or terminal device is RJ45 instead of RS-232, remove the adapter on the end of the serial cable and insert the exposed RJ45 connector into the RJ45 serial port on the workstation.

2. Open a terminal emulator application (such as HyperTerminal on a PC, or TERM, TIP, or Kermit in a UNIX environment), and configure the application as follows:

   - In a Windows environment, enter the following values: 9600 bits per second, 8 databits, no parity, 1 stop bit, and no flow control.
   - In a UNIX environment using TIP, enter the following string at the prompt:

     ```
     tip /dev/ttyb -9600
     ```

     If ttyb is already in use, use ttya instead.

Serial cable pinouts

The serial port is located on the port side of the Brocade VDX 6720. The switch uses an RJ-45 connector for the serial port. An RJ-45 to DB9 adaptor is also provided with the Brocade VDX 6720. The cable supplied with the switch is a rollover cable.

NOTE
To protect the serial port from damage, keep the cover on the port when not in use.

The serial port can be used to connect to a workstation to configure the Brocade VDX 6720 IP address before connecting the switch to a fabric or IP network. The serial port's parameters are fixed at 9600 baud, 8 data bits, and no parity, with flow control set to None.

Table 1 lists the serial cable pinouts.

TABLE 1 Serial cable pinouts

PIN	Signal	Description
1	Not supported	NA
2	Not supported	NA
3	TXD	Transmit data
4	GND	Logic ground
5	Not supported	NA
6	RXD	Receive data
7	Not supported	NA
8	Not supported	NA

Assigning permanent passwords

When you log in for the first time, Brocade recommends that you change the passwords for the default accounts.

The factory-configured default accounts on the switch are admin, user, and root. Use the default administrative account as shown in Table 2 to log in to the switch for the first time and to perform the basic configuration tasks.

The root account is reserved for development and manufacturing. The user account is read-only and used primarily for system monitoring.

TABLE 2 Default administrative account names and passwords

Account type	Login name	Password
Administrative	admin	password
User account (read-only)	user	password

Changing the default account passwords

When you change the default account password after you log in for the first time, only the default password rule is in effect. The rule specifies a minimum password length of eight characters. For advanced user and role management, including setting password rules, refer to the Security chapter of the *Brocade Network OS Administrator's Guide*.

1. Enter the **configure terminal** command to enter global configuration mode.
2. Enter the **username** command followed by the account name and the password parameter.
3. When prompted, enter the new password. and press **Enter**.

```
Switch# configure terminal
Entering configuration mode terminal
switch(config)# username admin password
(<WORD>;;User password satisfying password-attributes):********
```

Setting the switch IP address

You can configure the Brocade VDX 6720 with a static IP address, or you can use a Dynamic Host Configuration Protocol (DHCP) server to set the IP address of the switch. DHCP is enabled by default. The Brocade VDX 6720 supports both IPv4 and IPv6 format addresses.

Using DHCP to set the IP address

When using DHCP, the Brocade VDX 6720 obtains its IP address, subnet mask, and default gateway address from the DHCP server. The DHCP client can only connect to a DHCP server that is on the same subnet as the switch. If your DHCP server is not on the same subnet as the Brocade VDX 6720, use a static IP address.

To set an IPv4 IP address using DHCP, complete the following steps.

1. Log in to the switch using the admin account.
2. Configure the management interface with the following command:

```
switch(config)# interface Management 1/0
```

3. Configure the IP address using the following command:

```
switch(config-Management-1/0)# ip address dhcp
```

Setting a static IP address

Complete the following steps to set a static IP address.

1. Log in to the switch using the default password (the default password is *password*).
2. Use the **ip address** command to set the Ethernet IP address.

   If you are going to use an IPv4 IP address, enter the IP address in dotted decimal notation. You should also disable DHCP and enter a gateway address as well.

```
switch(config)# interface Management 1/0
switch(config-Management-1/0)# no ip address dhcp
switch(config-Management-1/0)# ip address 10.24.85.81/20
switch(config-Management-1/0)# ip gateway-address 10.24.80.1
```

ATTENTION

The ip gateway-address command will not be available on the Brocade VDX 6720 if the L3 or Advanced license is installed. In that case, use the following command sequence:

```
switch(config)# rbridge-id 1
switch(config-rbridge-id 1)# ip route 0.0.0.0/0 <default-gateway>
```

   If you are going to use an IPv6 address, enter the network information in semicolon-separated notation as prompted after the **ipv6 address** operand.

```
switch(config)# interface Management 1/0
switch(config-Management-1/0)# no ip address dhcp
switch(config-Management-1/0)# ipv6 address \
fd00;60;69bc;832;e61f;13ff;fe67;4b94/64
```

3. To display the configuration, use the **show running-config interface Management** command.

```
switch# show running-config interface Management 1/0
interface Management 1/0
 no ip address dhcp
 ip address 10.24.85.81/20
 ip gateway-address 10.24.80.1
 ipv6 address fd00;60;69bc;832;e61f;13ff;fe67;4b94/64
 no ipv6 address autoconfig
!
```

Setting stateless IPv6 autoconfiguration

IPv6 allows assignment of multiple IP addresses to each network interface. Each interface is configured with a link local address in almost all cases, but this address is only accessible from other hosts on the same network. To provide for wider accessibility, interfaces are typically configured with at least one additional global scope IPv6 address. IPv6 autoconfiguration allows more IPv6 addresses, the number of which is dependent on the number of routers serving the local network and the number of prefixes they advertise.

When IPv6 autoconfiguration is enabled, the platform will engage in stateless IPv6 autoconfiguration. When IPv6 autoconfiguration is disabled, the platform will relinquish usage of any autoconfigured IPv6 addresses that it may have acquired while IPv6 autoconfiguration was enabled. This same enabled or disabled state also enables or disables the usage of a link local address for each managed entity (though a link local address will continue to be generated for each switch) because those link local addresses are required for router discovery.

The enabled or disabled state of autoconfiguration does not affect any static IPv6 addresses that may have been configured. Stateless IPv6 autoconfiguration and static IPv6 addresses can co-exist.

1. Issue the **configure terminal** command to enter global configuration mode.
2. Take the appropriate action based on whether you want to enable or disable IPv6 autoconfiguration:
   - Enter the **ipv6 address autoconfig** command to enable IPv6 autoconfiguration for all managed entities on the target platform.
   - Enter the **no ipv6 address autoconfig** command to disable IPv6 autoconfiguration for all managed entities on the target platform.

Enabling and disabling Brocade VCS mode

Enable or disable a single switch for VCS™ mode as soon as passwords have been assigned and an IP address has been set. Enabling VCS mode is disruptive because a reboot is required once the mode has been enabled. Enabling or disabling VCS mode also causes the default configuration file for that mode to be applied. The Brocade VDX 6720 ships with a two-node VCS license by default. VCS mode is disabled by default.

The basic configuration tasks include enabling or disabling VCS mode explicitly, setting VCS parameters, and applying the default configuration. If you disable VCS mode, you do not have to set the other parameters. For more details about enabling VCS mode and setting VCS parameters, refer to the *Brocade Network OS Administrator's Guide* and the *Brocade Network OS Command Reference Guide*.

Enabling VCS mode

Perform the following steps to enable VCS mode.

1. Log in to the switch using an account that has the admin role.
2. Enter the **vcs enable** command, including the RBridge parameter, as in the following example.

```
vcs rbridge-id 1 enable
```

The switch reboots when you confirm that you want to enable VCS mode.

When the switch comes back up, if it is connected to other VCS-enabled switches, the negotiation protocols begin, determining which switch in the fabric is the principal switch and making sure that all domain IDs, and therefore RBridge IDs, are unique. Should the insistent domain ID not be unique, you can change it. Once the domain IDs are determined to be unique, they are equated to the RBridge IDs.

The switch with the lowest World Wide Name (WWN) becomes the principal switch, primarily for purposes of determining the uniqueness of the ID of the other switches in the fabric. The WWN is a unique identifier burned into the switch at the factory.

Another parameter that can be changed if necessary is the VCS ID. This identifies the VCS fabric of which the switch can be a part. By default, the VCS ID of every Brocade Brocade VDX 6720 is 1. Change the VCS ID if you need to create a new, separate VCS fabric.

3. If you need to change the VCS ID, enter the **vcs vcs-id** *x* command, where *x* is the new VCS ID number.
4. Enter the **copy running-config startup-config** command to apply the current running configuration to the startup configuration. This is important to capture any changes that have been made to the running configuration so that they will persist the next time the switch reboots in the same mode.

Disabling VCS mode

Perform the following steps to disable VCS mode.

1. Log in to the switch using an account that has the admin role.
2. Enter the **no vcs enable** command.
3. Reboot the switch.
4. When the switch comes back up, enter the **copy running-config startup-config** command to apply the default configuration to the startup configuration.

   This is important to capture any changes that have been made to the running configuration so that they will persist the next time the switch reboots in the same mode.

Setting the date and time

The Brocade VDX 6720 maintains the current date and time inside a battery-backed real-time clock (RTC) circuit. Date and time are used for logging events. Switch operation does not depend on the date and time; a Brocade VDX 6720 with an incorrect date and time value functions properly. Because the date and time are used for logging, error detection, and troubleshooting, you should set them correctly.

Understanding time zones

You can set the time zone for a switch by using the **clock TimeZone** command. The time zone setting has the following characteristics:

- The **clock TimeZone** setting automatically adjusts for Daylight Savings Time.

- Changing the time zone on a switch updates the local time zone setup and is reflected in local time calculations.
- By default, all switches are in the Greenwich Mean Time (GMT) time zone (0,0). If all switches in a fabric are in one time zone, it is possible for you to keep the time zone setup at the default setting.
- System services that have already started will reflect the time zone changes only after the next reboot.
- Time zone settings persist across failover for high availability.
- Time zone settings are not affected by Network Time Protocol (NTP) server synchronization.

The following regions are supported: Africa, America, Antarctica, Asia, Atlantic, Australia, Europe, Indian, and Pacific. One of these, along with a city name, establishes the time zone.

Understanding time synchronization

To keep the time in your network current, it is recommended that the principal switch has its time synchronized with at least one external NTP server. The other switches in the fabric will automatically take their time from the principal switch.

All switches in the fabric maintain the current clock server value in nonvolatile memory. By default, this value is the local clock server of the principal switch. Changes to the clock server value on the principal switch are propagated to all switches in the fabric.

When a new switch enters the fabric, the time server daemon of the principal switch sends out the addresses of all existing clock servers and the time to the new switch.

The **ntp server** command accepts multiple server addresses in IPv4 format. When multiple NTP server addresses are passed, **ntp server** sets the first obtainable address as the active NTP server. If there are no reachable time servers, then the local switch time is the default time.

Synchronizing local time using NTP

Perform the following steps to synchronize the local time using NTP.

1. Log in to the switch using the default password (the default password is *password*).
2. Enter the **ntp server** "<*IPv4 address*>" command, where <*IPv4 address*> is the IP address of the first NTP server in IPv4 format, which the switch must be able to access. The <*IPv4 address*> variable is optional. By default, this value is LOCL, which uses the local clock of the principal switch as the clock server.

   ```
   switch:admin> ntp server "132.163.135.131"
   ```

   To display the NTP server IP address, use the **show ntp status** [**switchid** <*switchid*> | **all**] command.

   ```
   switch:admin> show ntp status switchid 132.163.135.131
   ```

   The request is for the local switch unless a switch ID is specified. Specify the **all** parameter to send the request to all switches in the cluster.

If you need to remove an NTP server, use the **no** form of the **ntp server** command.

```
switch:admin> no ntp server "132.163.135.131"
```

Setting the clock (date and time)

The following procedure sets the local clock date and time. An active NTP server, if configured, automatically updates and overrides the local clock time. Time values are limited to between January 1, 1970 and January 19, 2038.

NOTE
You should set the clock only if there are no NTP servers configured. Time synchronization from NTP servers override the local clock.

1. Log in to the switch using the default password (the default password is *password*).
2. Enter the **clock set** <*year*>-<*month*>-<*day*>T<*hours*>:<*minutes*>:<*seconds*> command.

   The following example sets the clock to March 17, 2010, 15 minutes past noon:

   ```
   switch:admin > clock set 2010-03-17T12:15:00
   ```

3. To show the clock and time zone settings, use the **show clock [switchid** <*switchid*> | **all]** command.

   ```
   switch:admin > show clock switchid 1
   ```

Setting time zones

You must perform this procedure on *all* switches for which the time zone must be set. However, you only need to set the time zone once on each switch, because the value is written to nonvolatile memory. While not necessary for switch operation, setting a time zone is part of ensuring accurate logging and audit tracking. Time zone changes take effect after a reboot.

Use the **clock TimeZone** command to set the time zone.

1. Connect to the switch and log in using an account assigned to the admin role.
2. Enter the **clock TimeZone** <*region*>/<*city*> command.

   The following example changes the time zone to US/Pacific Standard Time:

   ```
   switch:admin > clock timezone America/Los_Angeles
   ```

Connecting network devices

Connecting to Ethernet or fast Ethernet hubs

For copper connections to Ethernet hubs, a 1000Base-T switch, or another Brocade device, a crossover cable is required. If the hub is equipped with an uplink port, it requires a straight-through cable instead of a crossover cable.

NOTE
The 802.3ab standard (automatic MDI or MDIX detection) calls for automatic negotiation of the connection between two 1000Base-T ports. Therefore, a crossover cable may not be required; a straight-through cable may work as well.

Connecting to workstations, servers, or routers

Straight-through UTP cabling is required for direct UTP attachment to workstations, servers, or routers using network interface cards (NICs).

Fiber cabling is required for direct attachment to Gigabit NICs or switches and routers through fiber ports.

Connecting a network device to a fiber port

For direct attachment from the Brocade device to a Gigabit NIC, switch, or router, fiber cabling with an LC connector is required. See "Installing an SFP or SFP+ transceiver" on page 28 for details about installing transceivers and cables.

Testing connectivity

After you install the network cables, you can test network connectivity to other devices by observing the LEDs related to network connection and performing trace routes. See Table 3 on page 24 for a description of the port states.

Creating Brocade inter-switch link trunks

In VCS mode, unless specifically disabled, inter-switch link (ISL) trunking between adjacent switches is automatic. All ports must be in the same port group and must be configured at the same speed. There is a limit of eight ports per trunk group. No separate licensing is required. For more information about Brocade trunks, see the *Brocade Network OS Administrator's Guide*.

Chapter

4

Brocade VDX 6720 Operation

In this chapter

- Powering on the Brocade VDX 6720 21
- LED activity interpretation. 21
- POST and boot specifications. 26
- Interpreting POST results 27
- Brocade VDX 6720 maintenance. 28
- Brocade VDX 6720 management 30

Powering on the Brocade VDX 6720

For details about powering on the Brocade VDX 6720, refer to "Providing power to the switch" on page 10.

Powering off the Brocade VDX 6720

To power off the Brocade VDX 6720, power off both power supplies by setting each power supply switch to "O" for the Brocade VDX 6720-24 or unplugging the power supplies for the Brocade VDX 6720-60.

LED activity interpretation

System activity and status can be determined through the activity of the LEDs on the switch.

There are three possible LED states: off (no light), a steady light, and a flashing light. Flashing lights may be slow, fast, or flickering. The LED colors are either green or amber. See Table 3 on page 24 and Table 4 on page 25 for details on LED behavior.

Sometimes, the LEDs flash either of the colors during boot, POST, or other diagnostic tests. This is normal; it does not indicate a problem unless the LEDs do not indicate a healthy state after all boot processes and diagnostic tests are complete.

Brocade VDX 6720 LEDs

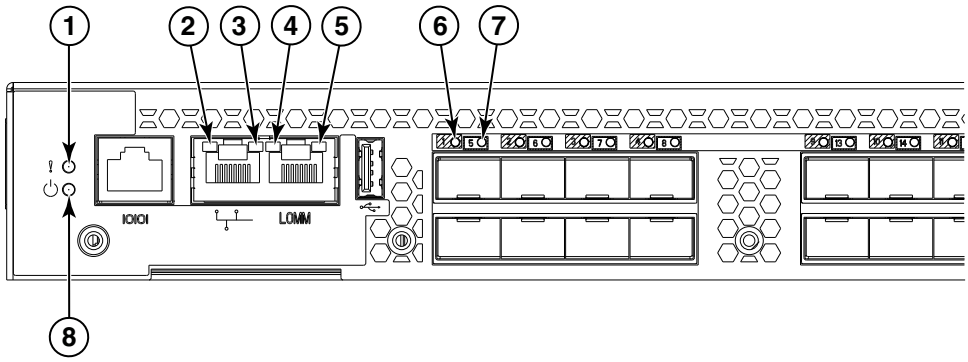
The Brocade VDX 6720 switches have the following LEDs:

- One bicolor system status LED (green and amber) on the port side.
- One power status LED (green) on the port side.

- Two Ethernet management port LEDs (green) for the Ethernet management port. The two LEDs show the status of the port link and the port activity.
- One bicolor port status LED (green and amber) for each port on the switch. These LEDs are arrayed above each pair of Ethernet ports on the Brocade VDX 6720-24 and below each pair on the Brocade VDX 6720-60. The left LED corresponds to the upper port of the pair and the right LED corresponds to the lower port.
- One power supply LED (green) to the left of the AC power plug on each power supply on the non-port side of the switch on the Brocade VDX 6720-60.
- One bicolor fan status LED (green and amber) at the bottom of each fan assembly on the non-port side of the switch on the Brocade VDX 6720-60.
- One power supply and fan assembly LED (green) above the AC power switch on each combined power supply and fan assembly on the non-port side of the switch on the Brocade VDX 6720-24.

LED locations

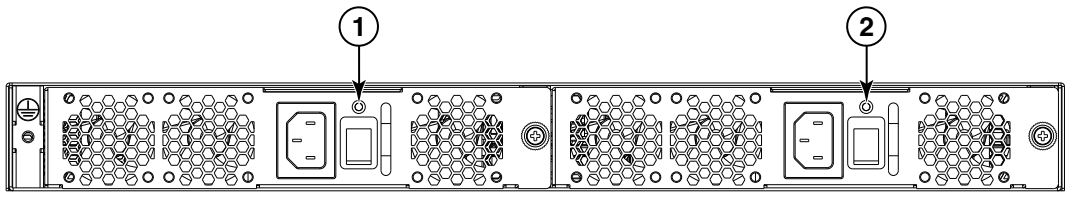
Figure 5 shows the LEDs on the port side of the Brocade VDX 6720-24. The port status LEDs for the GbE ports are staggered to correspond to the upper (left LED) and lower (right LED) ports in each pair. Refer to Figure 1 on page 4 for the numbering and locations of the GbE ports.



1	System status LED	5	RLO management Ethernet port activity LED
2	Switch management Ethernet port link LED	6	GbE port status LED (port 1 - top row)
3	Switch management Ethernet port activity LED	7	GbE port status LED (port 5 - bottom row)
4	RLO management Ethernet port link LED	8	System power LED

FIGURE 5 LEDs on the port side of the Brocade VDX 6720-24

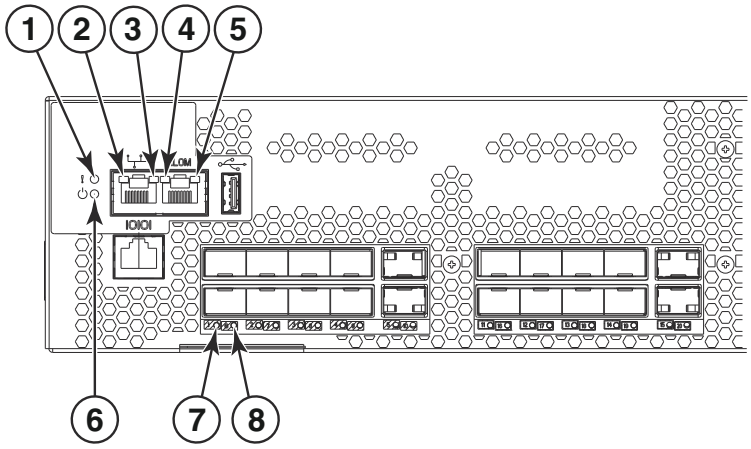
Figure 6 shows the LEDs on the non-port side of the Brocade VDX 6720-24.



1	Power supply and fan assembly #2 status LED	2	Power supply and fan assembly #1 status LED

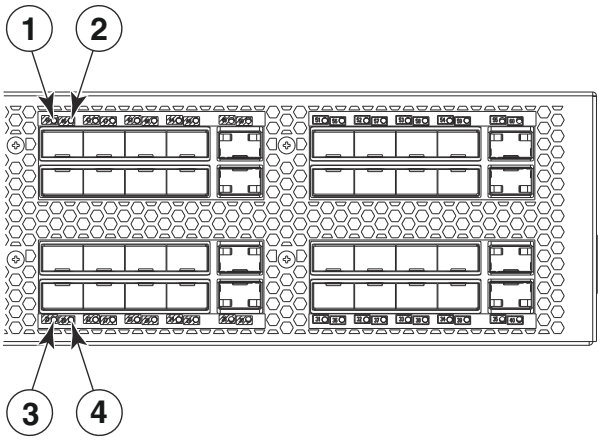
FIGURE 6 LEDs on the non-port side of the Brocade VDX 6720-24

Figure 7 and Figure 8 shows the LEDs on the port side of the Brocade VDX 6720-60.



1	System status LED	5	RLO management Ethernet port activity LED
2	Switch management Ethernet port link LED	6	System power LED
3	Switch management Ethernet port activity LED	7	GbE port status LED (port 1 - top row)
4	RLO management Ethernet port link LED	8	GbE port status LED (port 6 - bottom row)

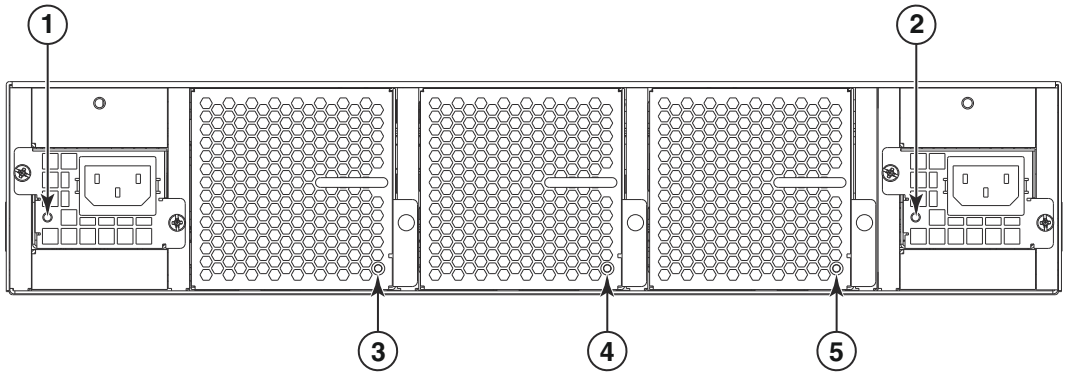
FIGURE 7 LEDs on the left of the port side of the Brocade VDX 6720-60



1	GbE port status LED (port 41 - top row)	3	GbE port status LED (port 21 - top row)
2	GbE port status LED (port 46 - bottom row)	4	GbE port status LED (port 26 - bottom row)

FIGURE 8 LEDs on the right of the port side of the Brocade VDX 6720-60

Figure 9 shows the LEDs on the non-port side of the Brocade VDX 6720-60.



1 Power supply #2 status LED
2 Power supply #1 status LED
3 Fan assembly #3 status LED
4 Fan assembly #2 status LED
5 Fan assembly #1 status LED

FIGURE 9 LEDs on the non-port side of the Brocade VDX 6720-60

LED patterns

Table 3 describes the port side LEDs and their behaviors.

TABLE 3 Port side LED patterns during normal operation

LED name	LED color	Status of hardware	Recommended action
System power (one LED [green])	Off (no light)	System is off or there is an internal power supply failure.	Verify the system is powered on (power supply switches to "I"), the power cables are attached, and your power source is live. If the system power LED is not green, the unit may be faulty. Contact your switch service provider.
	Steady green	System is on and power supplies are functioning properly.	No action required.
System status (one bicolor LED [green and amber])	Off (no light)	System is off or there is no power.	Verify the system is on and has completed booting.
	Steady green	System is on and functioning properly.	No action required.
	Blinking amber/green	Attention	Most likely a power supply or fan assembly is faulted. Verify the status.
	Steady amber (for more than 5 seconds)	A system fault has occurred or the switch is in an initialization state.	Check the management interface and the error log for details on the cause of the status. Contact your switch service provider.
Ethernet Link (Management and LOMM [Remote Lights Out] port) (one LED [green])	Off (no light)	There is no link.	No action required.
	Steady green	Link is present.	No action required.

TABLE 3 Port side LED patterns during normal operation (Continued)

LED name	LED color	Status of hardware	Recommended action
Ethernet Activity (Management and LOMM [Remote Lights Out] port) (one LED [green])	Off (no light)	There is no activity.	No action required.
	Blinking green	There is activity (traffic).	No action required.
Optical media port status (one bicolor LED [green and amber] for each 10 GbE port)	Off (no light)	No light or signal carrier on the media interface.	Verify that the transceiver is installed correctly and that the cable is connected correctly.
	Steady green	Link is present.	No action required.
	Flickering green	Online, frames flowing through port.	No action required.
	Steady amber	Carrier (light) is present, but not online.	No action required.
	Fast blinking amber (1/2 second interval)	Port is faulted.	Change the transceiver or reset the switch from the workstation.
	Slow blinking amber (2 second interval)	Port disabled.	Enable the port.

Table 4 describes the LEDs on the non-port side of the switches.

TABLE 4 Non-port side LED patterns during normal operation

LED name	LED color	Status of hardware	Recommended action
Power supply and fan assembly status (one LED [green] per power supply and fan assembly) (Brocade VDX 6720-24)	Off (no light)	Assembly is not receiving power or is turned off.	Verify the assembly is on and seated and the power cord is connected to a functioning power source.
	Steady green	Assembly is operating normally.	No action required.
	Blinking green	One of the following may have occurred: • Mismatched airflow on power supply and fan assembly on the Brocade VDX 6720-24. • One or more of the fans in the fan assembly has failed or the power supply has failed. • The power cord has been unplugged.	Take one of the following actions: • Replace power supply and fan assembly with a power supply and fan assembly that has correct airflow direction. Replace if necessary. • Replace the power supply and fan assembly. • Check the power plug.

TABLE 4 Non-port side LED patterns during normal operation (Continued)

LED name	LED color	Status of hardware	Recommended action
Power supply status(one LED [green] per power supply) (Brocade VDX 6720-60)	Off (no light)	Power supply is not receiving power or is off.	Verify the power supply is on and seated and the power cord is connected to a functioning power source.
	Steady green	Power supply is operating normally. Also, airflow mismatch or fault may have been detected.	No action required. Use the **show environment** command to check the state of the power supply.
	Blinking green	Power supply is faulty.	Try the following: • Check the power cable connection. • Verify that the power supply is powered on. • Replace the power supply.
Fan status (one bicolor LED {green and amber] per fan assembly)(Brocade VDX 6720-60)	Off (no light)	Fan assembly is not receiving power.	Try the following: • Verify the fan assembly is seated correctly. • Verify the switch is powered on.
	Steady green	Fan assembly is operating normally.	No action required.
	Steady amber (for more than 5 seconds)	Fan fault for one of the following reasons: • Mismatched airflow on fan assemblies. • One or more of the fans in the fan assembly has failed • The fan assembly was disabled by the user **NOTE:** When the switch is first powered on, the fan status LED will show amber until POST has completed.	Try the following: • Verify that the airflow symbol and part number on the replacement fan matches the fans in the chassis. Replace if necessary. • Replace the fan assembly. • Verify the fan assembly is enabled (use the **show environment fan** command).Re-enable if necessary.

POST and boot specifications

When the switch is turned on or rebooted, the switch performs a power-on, self-test (POST). Total boot time with POST can be several minutes. POST can be omitted after subsequent reboots by using the **fastboot** command or entering the **no diag post** command to persistently disable POST.

For more information about these commands, refer to the *Brocade Network OS Command Reference*.

POST

The success or failure results of the diagnostic tests that run during POST can be monitored through LED activity, the error log, or the command line interface.

POST includes the following tasks:

- Conducts preliminary POST diagnostics.
- Initializes the operating system.
- Initializes hardware.
- Runs diagnostic tests on several functions, including circuitry, port functionality, memory, statistics counters, and serialization.

Boot

In addition to POST, boot includes the following tasks after POST is complete:

- Performs universal port configuration.
- Initializes links.
- Analyzes fabric. If any ports are connected to other switches, the switch participates in a fabric configuration.
- Obtains a domain ID and assigns port addresses.
- Constructs unicast routing tables.
- Enables normal port operation.

Interpreting POST results

POST is a system check that is performed each time the switch is powered on, rebooted, or reset. During POST, the LEDs flash either amber or green. Any errors that occur during POST are listed in the error log.

Complete the following steps to determine whether POST completed successfully and whether any errors were detected.

1. Verify that the switch LEDs indicate that all components are healthy.

   See Table 3 and Table 4 for descriptions and interpretations of LED patterns.

2. Verify that the switch prompt displays on the terminal of a computer workstation connected to the switch.

   If there is no switch prompt when POST completes, press **Enter**. If the switch prompt still does not display, try opening a Telnet session or accessing the switch through another management tool. If this is not successful, the switch did not successfully complete POST. Contact your switch supplier for repair.

3. Review the switch system log for errors. Any errors detected during POST are written to the system log, accessible through the **show logging raslog** command.

For information about all referenced commands, and on accessing the error log, refer to the *Brocade Network OS Administrator's Guide*. For information about error messages, refer to the *Brocade Network OS Message Reference*.

Brocade VDX 6720 maintenance

The Brocade VDX 6720 is designed for high availability and low failure; it does not require any regular physical maintenance. The SFP+ optical transceivers and diagnostic tests are described in the following sections.

Supported transceivers

The Brocade VDX 6720 supports only Brocade-branded SFP and SFP+ optical or copper transceivers. For its GbE connections, the Brocade VDX 6720 uses SFP and SFP+ transceivers that support either optical or Brocade-branded direct-attach copper (Laserwire) and optical cables.

The optical SFP+ transceivers support both Short Reach (SR) and Long Reach (LR) modules. Direct-attach copper cables support distances of 1 meter, 3 meters, and 5 meters. Direct-attach optical cables support distances of 10 meters and 20 meters.

Non-branded active twinax cables can be used, but Brocade does not support them.

Installing an SFP or SFP+ transceiver

For its DCB connections, the Brocade VDX 6720 uses SFP and SFP+ transceivers that support either optical or Brocade-branded direct-attached copper (Laserwire) and optical cables. The optical SFP+ transceivers support both Short Reach (SR) and Long Reach (LR) modules. Direct attached copper cables support distances of 1 meter, 3 meters, and 5 meters. Direct attached optical cables support distances of 10 meters and 20 meters.

To monitor the transceivers, the **showmedia** command output shows the transceiver information for all interfaces on the switch. Third party transceivers are allowed. Brocade will provide support for such a system but may require that a Brocade transceiver be used for troubleshooting.

Support will not be provided if there is an issue with the third party transceiver.

Complete the following steps to install an SFP+ transceiver.

1. Remove any protector plugs from the transceivers and the ports.
2. Making sure that the bail (wire handle) is in the unlocked position, place the SFP+ transceiver in the correctly oriented position on the port, as shown in Figure 10.
3. Slide the SFP+ transceiver into the port until you feel it click into place; then close the bail.

NOTE
Each SFP+ transceiver has a 10-pad gold-plated edge connector on the bottom. The correct position to insert an SFP+ transceiver in the upper row of ports is with the gold-plated edge down. The correct position to insert an SFP+ transceiver in the lower row of ports is with the gold-plated edge up.

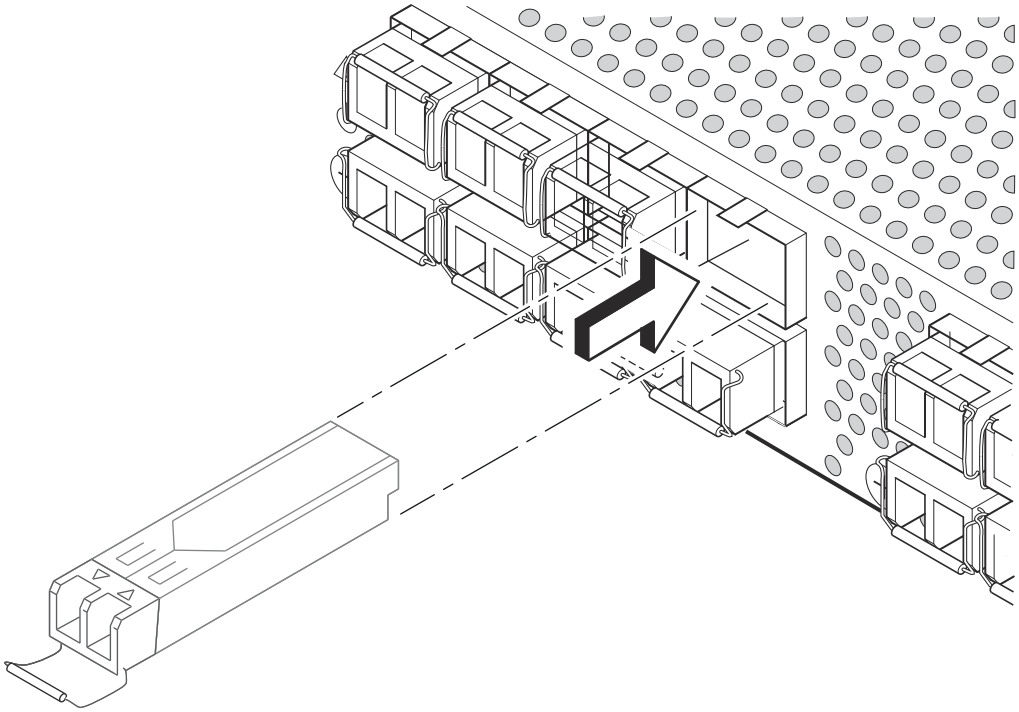


FIGURE 10 Installing an SFP+ transceiver in the upper row of port slots

Diagnostic tests

In addition to POST, the Network OS includes diagnostic tests to help you troubleshoot the hardware and firmware. This includes tests of internal connections and circuitry, fixed media, and the transceivers and cables in use.

The tests are implemented by command, either through a Telnet session or through a console set up to the serial connection to the switch. Some tests require the ports to be connected by external cables, to allow diagnostics to verify the serializer/deserializer interface, transceiver, and cable. Some tests require loopback plugs. See the *Brocade Network OS Administrator's Guide* and the *Brocade Network OS Command Reference Guide* for more details about diagnostic tests and commands.

Diagnostic tests run at link speeds of 1 or 10 Gbps depending on the speed of the link being tested and the type of port.

NOTE
Diagnostic tests might temporarily lock the transmit and receive speed of the links during diagnostic testing.

To monitor the transceivers, the **show media** command output shows the transceiver information for all interfaces on the switch. Any unqualified transceiver is disabled and a log message is generated.

Brocade VDX 6720 management

You can use the management functions built into the Brocade VDX 6720 to monitor the fabric topology, port status, physical status, and other information to help you analyze switch performance and to accelerate system debugging.

For information about upgrading the version of Network OS installed on your switch, see the *Brocade Network OS Administrator's Guide.*

You can manage the Brocade VDX 6720 using any of the management options listed in Table 5.

TABLE 5 Management options for the Brocade VDX 6720

Management tool	Out-of-band support	In-band support
Command line interface (CLI) Up to two admin sessions and four user sessions simultaneously. For more information, refer to the *Brocade Network OS Administrator's Guide* and the *Brocade Network OS Command Reference Guide*.	Ethernet or serial (console port) connection	In standalone mode only. Not available in VCS mode.
Standard SNMP applications For information, refer to the *Brocade Network OS MIB Reference*.	Ethernet or serial (console port) connection	N/A
Brocade Network Advisor For information, refer to the *Brocade Network Advisor SAN+IP User Manual*.	Ethernet (preferred) or serial (console port) connection	N/A

Chapter

5

FRU Removal and Replacement Procedures

In this chapter

- Before beginning the installation 31
- Replacing a combined FRU in a Brocade VDX 6720-24 32
- Replacing a power supply FRU in a Brocade VDX 6720-60 36
- Replacing a fan assembly in the Brocade VDX 6720-60 39
- Installing a DC power supply 42

Before beginning the installation

The field-replaceable units (FRUs) in the Brocade VDX 6720 switches can be removed and replaced without special tools. The switches can continue operating during the FRU replacements if the conditions specified in the procedure are followed. This covers both the AC-DC (AC) and DC-DC (DC) versions of the combined power supply and fan FRUs in the Brocade VDX 6720-24 switch and the separate power supply and fan FRUs in the Brocade VDX 6720-60 switch.

Refer to "Installing a DC power supply" if you are installing a DC power supply for the first time.

NOTE
Read the "Installation and safety considerations" on page 7 before servicing.

CAUTION

This document describes how to change field-replaceable units (FRUs) for units with either a port-side air exhaust or a port-side air intake. You must replace a failed FRU with a FRU of the same type. This applies to both power supplies and fan assemblies.
A new FRU must have the same part number (P/N) as the FRU being replaced. The manufacturing P/N is located on the top of the FRU.
The P/N ends in either -F (front-to-rear airflow) or -R (rear-to-front airflow). You must use a replacement FRU that has the same airflow designator with the part number.

If a mismatched power source or fan assembly is installed by mistake, a warning is sent to the console. The warning messages will be similar to the following:

- For a fan mismatch: [WARNING, Brocade VDX 6720, MISMATCH in FAN Air Flow direction. Replace FRU with fan air flows in same direction.
- For a power supply or combined power supply and fan mismatch: [WARNING, Brocade VDX 6720, MISMATCH in PSU-FAN FRUS Air Flow direction. Replace PSU with fan air flows in same direction.

You can use external labels as a guide. The power supplies and fan assemblies are labeled with an airflow symbol on the faceplate to indicate whether the assembly takes in or exhausts air. The symbol also appears on the top of the FRU. All FRUs in a chassis must have the same label affixed so that airflow direction is consistent. Figure 11 illustrates examples of the airflow labels.

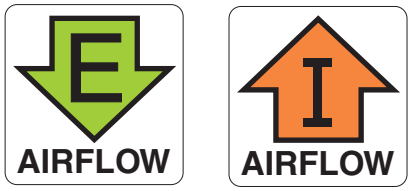


FIGURE 11 Examples of airflow symbols

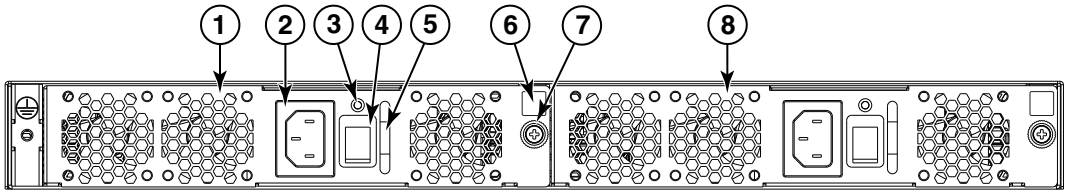
The green **E** symbol indicates an exhaust FRU. This unit pulls air in from the port side of the switch and exhausts it out the non-port side. This is called front-to-back airflow or forward airflow. This symbol should appear on FRUs with part numbers ending with **-F.**

The orange **I** symbol indicates an intake FRU. This unit pulls air in from the non-port side of the switch and exhausts it out the port side. This is called back-to-front airflow or reverse airflow. This symbol should appear on FRUs with part numbers ending with **-R**.

The **show environment fan** command will indicate either “forward” or “reverse” airflow.

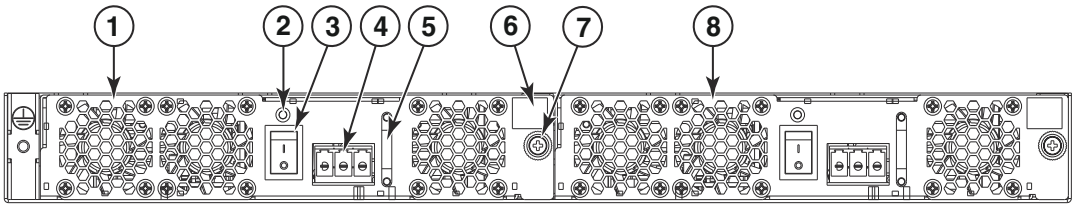
Replacing a combined FRU in a Brocade VDX 6720-24

Figure 12 shows the two combined AC power supply and fan assemblies in the Brocade VDX 6720-24. The Network OS identifies the FRUs from left to right as power supply and fan assembly #2 and power supply and fan assembly #1. Figure 13 shows the combined DC power supply and fan assemblies.



1	Power supply and fan assembly #2	5	Handle
2	AC power cord receptacle	6	Airflow label
3	Status LED	7	Captive screw
4	On/off switch	8	Power supply and fan assembly #1

FIGURE 12 Brocade VDX 6720-24 AC power supply and fan assemblies on the non-port side



1	Power supply and fan assembly #2	5	Handle
2	Status LED	6	Airflow label
3	On/off switch	7	Captive screw
4	DC power cord receptacle	8	Power supply and fan assembly #1

FIGURE 13 **Brocade VDX 6720-24 DC power supply and fan assemblies on the non-port side**

ATTENTION
Maintain all power supply and fan assemblies in operational condition to provide redundancy.

CAUTION

Because the cooling system relies on pressurized air, do not leave any of the power supply and fan assembly slots empty longer than two minutes while the switch is operating. If a power supply or fan assembly fails, leave it in the switch until it can be replaced.

CAUTION

Disassembling any part of the power supply and fan assembly voids the warranty and regulatory certifications. There are no user-serviceable parts inside the power supply and fan assembly.

Table 6 describes the power supply and fan assembly status LED colors, behaviors, and actions required, if any.

TABLE 6 Brocade VDX 6720-24 LED behavior, descriptions, and required actions

LED color and behavior	Description	Action required
Off (no light)	Assembly is not receiving power or is turned off.	Verify the assembly is on and seated and the power cord is connected to a functioning power source.

TABLE 6 Brocade VDX 6720-24 LED behavior, descriptions, and required actions

LED color and behavior	Description	Action required
Steady green	Assembly is operating normally.	No action required.
Blinking green	One of the following may have occurred: • Mismatched airflow on power supply and fan assembly • The power supply and fan assembly was disabled by the user. • The power supply and fan assembly power switch has been turned off or the unit has been unplugged. • One or more of the fans in the fan assembly has failed or the power supply has failed.	Take one of the following actions: • Replace the power supply and fan assembly with one that has the correct airflow direction. • Verify that the power supply and fan assembly is enabled. • Check the power switch and plug. • Replace the power supply and fan assembly.

Time and items required

Replacing a combined power supply and fan assembly in the switch should take less than two minutes.

You need the following items to replace a power supply and fan assembly in a Brocade VDX 6720-24:

- A new power supply and fan assembly (must have the same part number and the same airflow label as the power supply and fan assembly being replaced)
- A #1 Phillips screwdriver

Replacing the power supply and fan assembly

Complete the following steps to replace a combined power supply and fan assembly in a Brocade VDX 6720-24.

1. Unplug the power cord from the combined power supply and fan assembly you are replacing.
2. Unscrew the captive screw on the power supply and fan assembly you are replacing using the Phillips screwdriver.
3. Remove the power supply and fan assembly from the chassis by pulling the handle out and away from the chassis.

CAUTION

The power supply switch must be in the off position when inserting it in the chassis.

4. Ensure that the new power supply and fan assembly has the same part number as the FRU being replaced and then install the new FRU in the chassis:

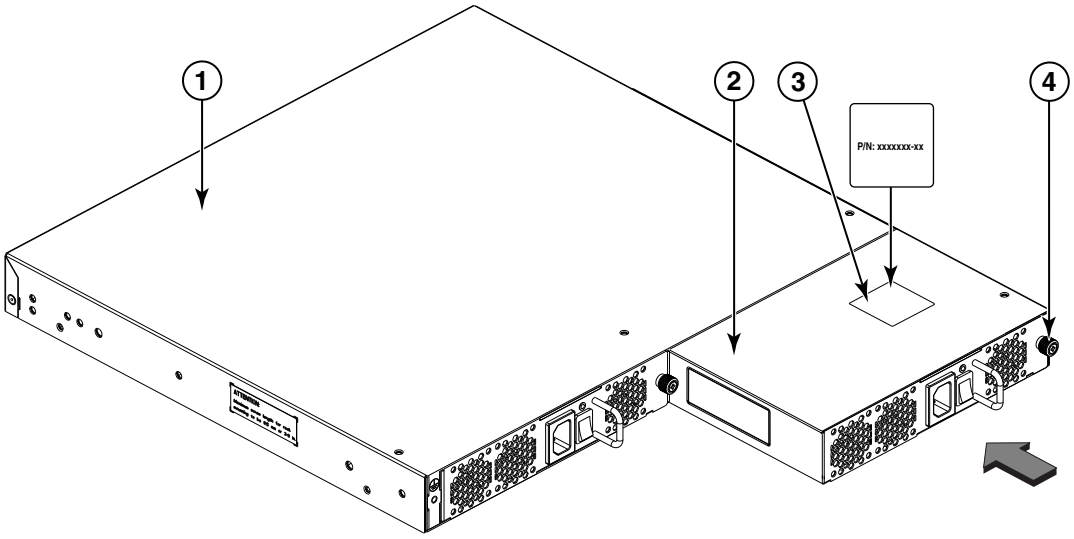
a. Orient the new power supply and fan assembly with the captive screw on the right as shown in Figure 14 or Figure 15.

CAUTION

Do not force the installation. If the power supply and fan assembly does not slide in easily, ensure that it is correctly oriented before continuing.

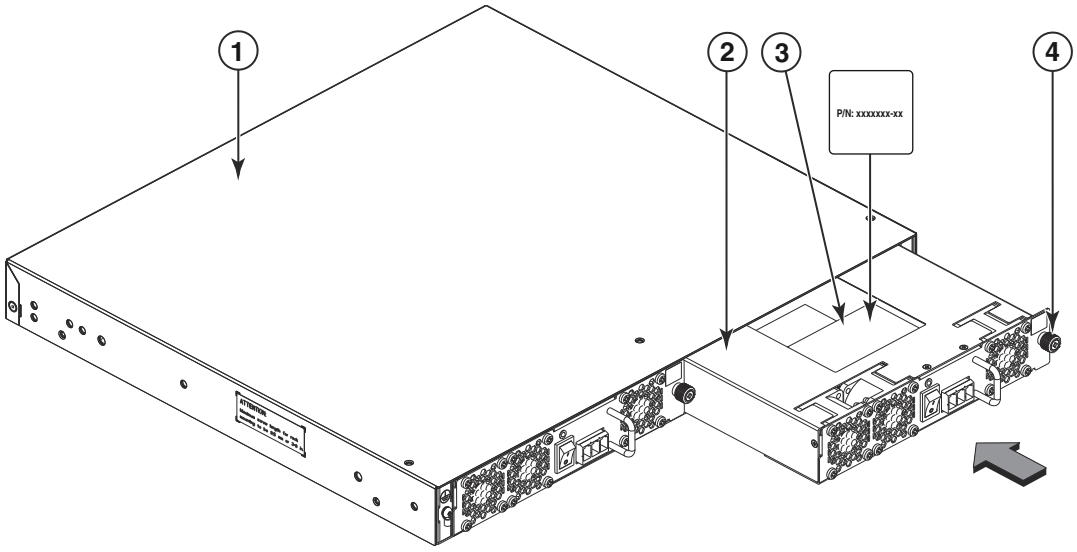
b. Gently push the power supply and fan assembly into the chassis until it is firmly seated.

c. Using the Phillips screwdriver, secure the power supply and fan assembly to the chassis by tightening the captive screw.



1	Brocade VDX 6720-24 chassis	3	Label with part number
2	AC power supply and fan assembly	4	Captive screw

FIGURE 14 Orientation of the AC power supply and fan assembly in the Brocade VDX 6720-24



1	Brocade VDX 6720-24 chassis	3	Label with part number
2	DC power supply and fan assembly	4	Captive screw

FIGURE 15 Orientation of the DC power supply and fan assembly in the Brocade VDX 6720-24

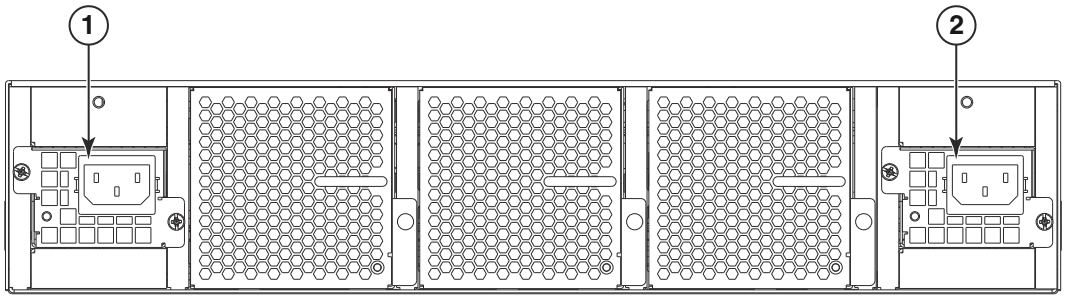
5. Verify that the power supply and fan assembly status LED is steady green to indicate normal operation (see Table 6 for more LED information).

   You can display the power supply and fan assembly status using the following commands from the CLI:

   - **show system**
   - **show environment fan**
   - **show environment power**

Replacing a power supply FRU in a Brocade VDX 6720-60

The Brocade VDX 6720-60 has two power supplies, as displayed in Figure 16. The Network OS identifies the power supplies from left to right on the non-port side as power supply #2 and power supply #1.



1 Power supply #2 2 Power supply #1

FIGURE 16 Brocade VDX 6720-60 power supplies on the non-port side

ATTENTION
Maintain all power supply and fan assemblies in operational condition to provide redundancy.

CAUTION
Because the cooling system relies on pressurized air, do not leave any of the power supply and fan assembly slots empty longer than two minutes while the switch is operating. If a power supply or fan assembly fails, leave it in the switch until it can be replaced.

CAUTION
Disassembling any part of the power supply and fan assembly voids the warranty and regulatory certifications. There are no user-serviceable parts inside the power supply and fan assembly.

Table 7 describes the power supply status LED colors, behaviors, and actions required, if any.

TABLE 7 Brocade VDX 6720-60 power supply status LED behavior, description, and required actions

LED color and behavior	Description	Action required
Off (no light)	Power supply is not receiving power or is off.	Verify that the power supply is on and seated and the power cord is connected to a functioning power source.
Steady green	Power supply is operating normally.	No action is required.
Blinking green	Power supply cable is disconnected - blinking green for ~20 seconds, then off. The power supply has failed	Check the power cable connection. Replace the power supply

Determining the need to replace a power supply

Use one of the following methods to determine the status of the power supplies:

- Check the power supply status LED (see Table 7).
- Enter one of the following commands at the prompt to display power supply status:
  - **show chassis**
  - **show environment power**

Time and items required

Replacing a power supply in the Brocade VDX 6720-60 should take less than two minutes to complete.

You need the following items to replace a power supply in a Brocade VDX 6720-60:

- A new power supply (must have the same part number and the same airflow label as the power supply being replaced; refer to Figure 4 on page 6 for the location of the airflow label)
- A #1 Phillips screwdriver

Replacing a power supply

Complete the following steps to replace a power supply in a Brocade VDX 6720-60.

1. To leave the Brocade VDX 6720-60 in service while replacing a power supply, verify that the other power supply (the one not being replaced) has been powered on for at least four seconds and has a steady green status LED.
2. Ensure that the replacement power supply has the same part number and airflow label as the power supply being replaced.
3. Unplug the power cord from the power supply that is being replaced.
4. Using the Phillips screwdriver, unscrew the two captive screws on the power supply.
5. Remove the power supply from the chassis by pulling the handle on the power supply out and away from the chassis.
6. Install the new power supply in the chassis:

    a. Orient the power supply with the status LED on the left, as shown in Figure 17.

CAUTION

Do not force the installation. If the power supply does not slide in easily, ensure that the power supply is correctly oriented before continuing.

    b. Gently push the power supply into the chassis until it is firmly seated.

    c. Secure the power supply to the chassis by tightening the two captive screws using the Phillips screwdriver.

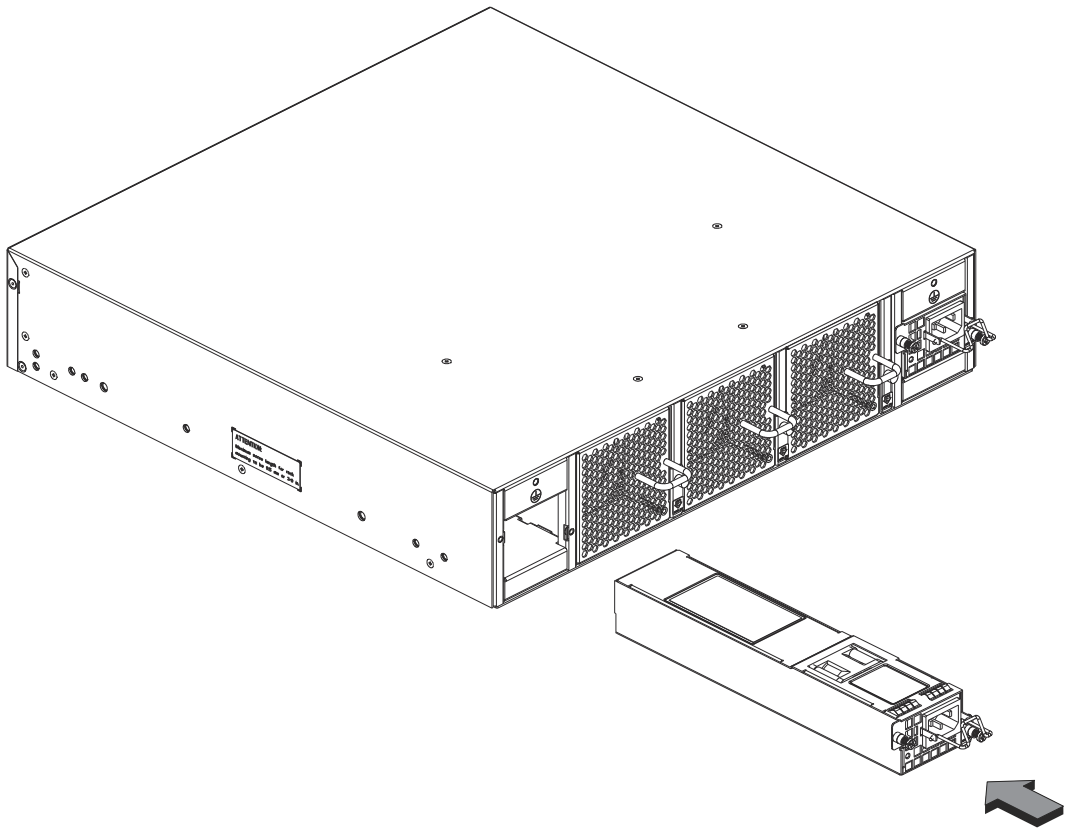


FIGURE 17 Inserting the power supply in the Brocade VDX 6720-60

7. Plug the power cord into the power supply to power on the unit.

   The power supply will immediately attempt to power up.

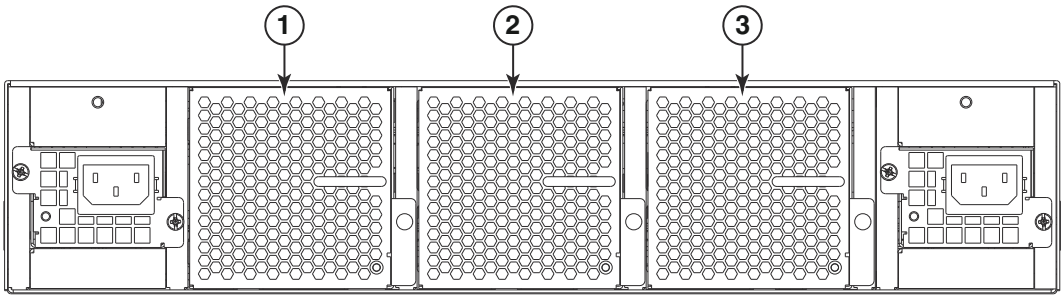
8. Verify that the LED on the new power supply displays steady green while the Brocade VDX 6720-60 is operating (see Table 7). If the LED is not steady green, ensure that the power supply is securely installed and seated properly.

   You can enter one of the following commands at the command line prompt to display power supply status:

   - **show chassis**
   - **show environment power**

Replacing a fan assembly in the Brocade VDX 6720-60

The Brocade VDX 6720-60 has three fan assemblies as displayed in Figure 18. The Network OS identifies the fan locations from left to right as fan assembly #3, fan assembly #2, and fan assembly #1.



1 Fan assembly #3
2 Fan assembly #2
3 Fan assembly #1

FIGURE 18 Brocade VDX 6720-60 fan assemblies on the non-port side

ATTENTION
Maintain all power supply and fan assemblies in operational condition to provide redundancy.

CAUTION
Because the cooling system relies on pressurized air, do not leave any of the power supply and fan assembly slots empty longer than two minutes while the switch is operating. If a power supply or fan assembly fails, leave it in the switch until it can be replaced.

CAUTION
Disassembling any part of the power supply and fan assembly voids the warranty and regulatory certifications. There are no user-serviceable parts inside the power supply and fan assembly.

Table 8 describes the fan assembly status LED colors, behaviors, and actions required, if any.

TABLE 8 Brocade VDX 6720-60 fan assembly status LED behavior, description, and required actions

LED color and behavior	Description	Action required
Off (no light)	Fan assembly is not receiving power.	Verify that the fan assembly is seated correctly.

TABLE 8 Brocade VDX 6720-60 fan assembly status LED behavior, description, and required actions (Continued)

LED color and behavior	Description	Action required
Steady green	Fan assembly is operating normally.	No action required.
Steady amber (for more than 5 seconds)	Fan fault for one of the following reasons: • A fan assembly with mismatched airflow is present. • The fan assembly was disabled by the user. • One or more of the fans in the fan assembly has failed. **NOTE:** When the switch is first powered on, the fan assembly status LED will show amber until POST has completed.	Try one of the following: • Replace the mismatched fan assembly with one that has the correct airflow direction. • Re-enable the fan assembly. • Replace the faulty fan assembly.

Determining the need to replace a fan assembly

Use one of the following methods to determine the status of the fan assemblies:

- Check the fan status LED on the face of the fan assembly (see Table 8).
- Enter one of the following commands in the command line interface to display fan status:
  - **show chassis**
  - **show environment fan**

Time and items required

Replacing a fan assembly in the Brocade VDX 6720-60 should take less than two minutes to complete.

You need the following items to replace a fan assembly in the Brocade VDX 6720-60:

- A new fan assembly (must have the same part number and the same airflow label as the fan assembly being replaced; refer to Figure 4 on page 6 for the location of the airflow label)
- A #1 Phillips screwdriver

Replacing a Brocade VDX 6720-60 fan assembly

Complete the following steps to replace a fan assembly in a Brocade VDX 6720-60.

1. Using the Phillips screwdriver, unscrew the captive screw on the fan assembly.
2. Ensure that the replacement fan assembly has the same part number and airflow label as the fan assembly being replaced.
3. Remove the fan assembly from the chassis by pulling the handle on the fan assembly out and away from the chassis.
4. Install the new fan assembly in the chassis:

a. Orient the new fan assembly with the captive screw on the right, as shown in Figure 19.

CAUTION

Do not force the installation. If the fan assembly does not slide in easily, ensure that it is correctly oriented before continuing.

b. Gently push the fan assembly into the chassis until it is firmly seated.

c. Using the Phillips screwdriver, secure the fan assembly to the chassis by tightening the captive screw.

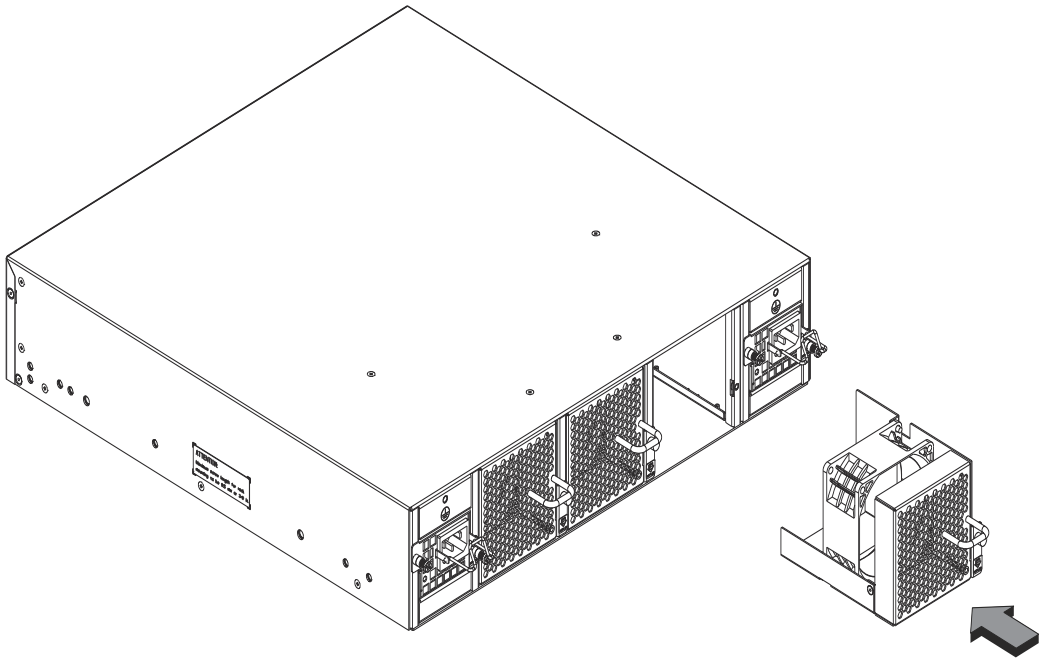


FIGURE 19 Inserting the fan assembly in the Brocade VDX 6720-60

5. Verify that the fan status LED is steady green to indicate normal operation (see Table 8).

   You can enter one of the following commands at the command line prompt to display fan status:

   - **show chassis**
   - **show environment fan**

Installing a DC power supply

Use the following procedures for DC power supplies in Brocade VDX 6720 switches. The illustrations show a power supply for the Brocade VDX 6720-60, but the same steps should be followed for wiring the combined power supply and fan assembly for the Brocade VDX 6720-24.

CAUTION

Before beginning the installation, see the precautions in "Regulatory compliance" on page 50.

To install an DC power supply, complete the following steps.

1. If necessary, remove the captive screws located in the upper left and the bottom right of the device.
2. If the empty power supply bay has a cover plate, remove the two screws near the edges of the cover plate to unlock the plate, then remove the plate.
3. Remove the DC power supply from its packaging. (refer to Figure 20)

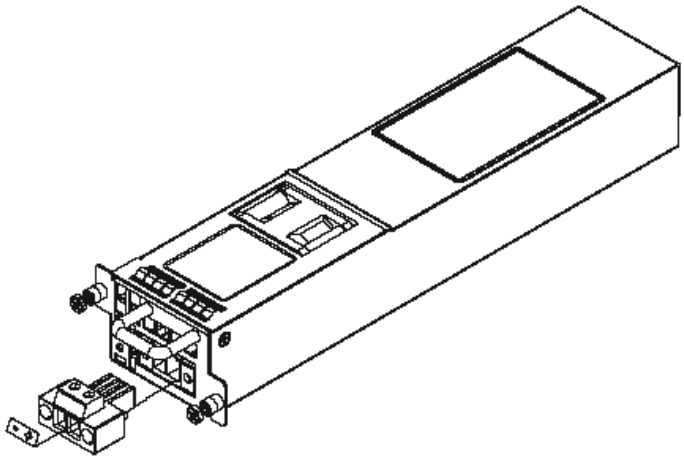
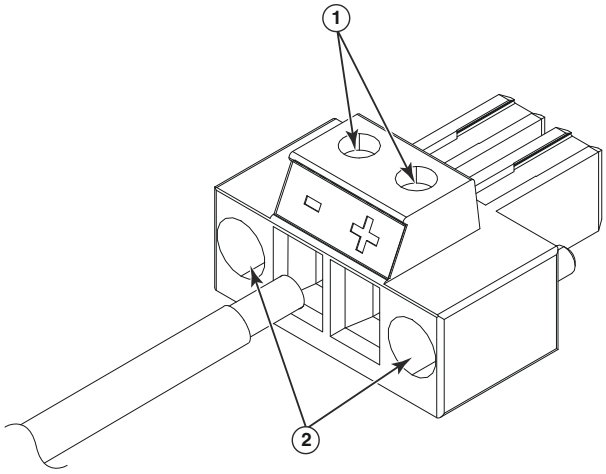


FIGURE 20 The DC power supply for the Brocade VDX 6720-60

4. Insert the wires into the DC wiring assembly (refer to Figure 21).

NOTE
The wire size for DC plus and DC return must be 14AWG minimum

5. Use the wire tightening screws to secure the wires.



1 Wire tightening screws 2 Assembly screws

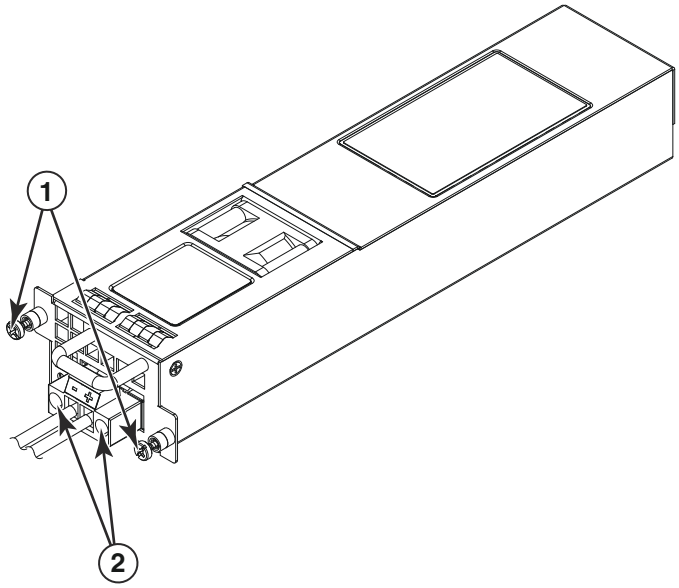
FIGURE 21 The DC wiring assembly

6. With one hand, hold the bar on the front panel of the power supply. With the other hand, support the underside of the power supply, and insert the power supply into the empty power supply slot. Press until the supply is completely in the slot, so that the connectors on the back of the supply are fully engaged with the pins on the power backplane.

CAUTION

Make sure you insert the power supply right-side up. It is possible to insert the supply upside down, although the supply will not engage with the power backplane when upside down. The power supply is right-side up when the manufacturer label is on the top.

7. Secure the two screws near the edges of the supply to lock the supply in place (refer to Figure 22).



1 Chassis attachment screws 2 Assembly screws

FIGURE 22 DC power supply screws

8. Connect the wire to your DC power source, making sure to connect the -48V cable to the negative terminal on the power supply and the 0V cable to the positive terminal as marked on the power supply.

The equipment installation must meet NEC/CEC code requirements. Consult local authorities for regulations.

DANGER

DC return shall be isolated from the chassis ground (DC-I) when connections to the power supply are made.

CAUTION

To insure adequate bonding when attaching the provided Panduit LCD6-10AF two-hole ground lug, a minimum of 20 PSI of torque is required to be applied to the mounting hardware used to attach the ground lug. Use a star washer to ensure an NEBS compliant connection.

Appendix

Brocade VDX 6720 Specifications

A

In this appendix

- Weight and physical dimensions 47
- Facility requirements 47
- Power supply specifications 48
- Environmental requirements 49
- General specifications 49
- Data transmission ranges 50
- Memory specifications 50
- Regulatory compliance 50
- Electrical cautions 54
- Regulatory certifications 57
- Environmental regulation compliance 57

Weight and physical dimensions

Table 9 lists the weight and dimensions of the Brocade VDX 6720 switches.

TABLE 9 Physical specifications

Dimension	Value
Height	1U or 4.3 cm (1.7 in.) - Brocade VDX 6720-24 2U or 8.9 cm (3.5 in.) - Brocade VDX 6720-60
Depth	38.1 cm (15 in.) - Brocade VDX 6720-24 43.2 cm (17 in.) - Brocade VDX 6720-60
Width	42.9 cm (16.89 in.) - Brocade VDX 6720 both models
Weight (with all power supplies and fan assemblies, and no transceivers installed)	approx. 7.3 kg (16.1 lb) - Brocade VDX 6720-24 approx. 15.88 kg (35 lb) - Brocade VDX 6720-60

Facility requirements

Table 10 provides the facilities requirements that must be met for the Brocade VDX 6720 switches.

TABLE 10 Facility requirements

Type	Requirements
Electrical	• Primary AC input 85-265 VAC nominal, 47-63 Hz; switch autosenses input voltage • Adequate supply circuit, line fusing, and wire size, as specified by the electrical rating on the switch nameplate • Circuit protected by a circuit breaker and grounded in accordance with local electrical codes Refer to Table 11 on page 48 for complete power supply specifications.
Thermal	• Ambient air temperature not exceeding 40° C (104° F) while the switch is operating
Cabinet (when rack-mounted)	• One rack unit (1U) in a 48.3 cm (19-inch) cabinet - Brocade VDX 6720-24 Two rack units (2U) in a 48.3 cm (19-inch) cabinet - Brocade VDX 6720-60 • All equipment in cabinet grounded through a reliable branch circuit connection • Additional weight of switch not to exceed the cabinet's weight limits • Cabinet secured to ensure stability in case of unexpected movement

Power supply specifications

The power supplies are universal and capable of functioning worldwide without voltage jumpers or switches. They meet IEC 61000-4-5 surge voltage requirements and are autoranging in terms of accommodating input voltages and line frequencies.

Table 11 lists the power supply specifications for the Brocade VDX 6720 switches.

TABLE 11 System power specifications

Specification	Value
Maximum output (per power supply)	250 watts, 12 VDC - Brocade VDX 6720-24 500 watts, 12 VDC - Brocade VDX 6720-60
AC input power draw	Brocade VDX 6720-24 - Idle: 106 W, Maximum: 132 W Brocade VDX 6720-60 - Idle: 270 W, Maximum: 330 W
AC input voltage	85-264 VAC, nominal 100-240 VAC
AC input line frequency	47-63 Hz, nominal 50-60 Hz
AC inrush current	Brocade VDX 6720-24 - Maximum of 50A @ 240 VAC for 10ms or less Brocade VDX 6720-60 - Maximum of 30A @ 25°C
Input line protection	AC lines are fused

Environmental requirements

Table 12 lists the acceptable environmental ranges for both operating and nonoperating (such as during transportation or storage) conditions.

TABLE 12 Environmental requirements

Condition	Acceptable during operation	Acceptable during non-operation
Ambient Temperature	0° to 40°C (32° to 104°F)	-25° to 70°C (-13° to 158°F)
Humidity	10% to 85% RH non-condensing, at 40°C (104°F)	10% to 90% RH non-condensing, at 70°C (158°F)
Altitude	0 to 3 km (9,842 feet) above sea level	0 to 12 km (39,370 feet) above sea level
Shock	20 G, 6 ms, half-sine wave	33 G, 11 ms, half-sine wave, 3/eg Axis
Vibration	0.5 G sine, 0.4 gms random, 5-500 Hz	2.0 G sine, 1.1 gms random, 5-500 Hz
Airflow	Maximum - 101.9 cmh (60 cfm) Nominal - 74.8 cmh (44 cfm)	N/A
Heat dissipation	Brocade VDX 6720-24 - 450 BTU/hr Brocade VDX 6720-60 - 1126 BTU/hr	N/A

General specifications

Table 13 lists the general specifications for the Brocade VDX 6720 switches.

TABLE 13 General specifications

Specification	Description
System architecture	Nonblocking shared-memory switch
System processor	1.3 GHz PowerPC
Aggregate switch I/O bandwidth	240 - Gbps Brocade VDX 6720-24 600 Gbps - Brocade VDX 6720-60
Port-to-port latency	Less than 600 nanoseconds on the same ASIC, 1.8 microseconds for multi-ASIC

Data transmission ranges

Table 14 provides the data transmission ranges for different cable types and port speeds for all ports.

TABLE 14 Data transmission ranges

Cable and connector type	Connector	Cable	Distance
Active copper (Laserwire)	SFP copper	Plastic optical fiber	Up to 20 m (65.62 ft) [1 m (3.28 ft), 3 m (9.84 ft), and 5 m (16.40 ft) supported]
Active optical cable	SFP+ optical	Plastic optical fiber	10m (32.81 ft) and 20m (65.62 ft)
10GE-SR SFP+	SFP+ MMF, SR	MM OM2 MM OM3	82 m (269.03 ft) 300 m (984.25 ft)
10GE-LR SFP+	SFP+ SMF, LR	SM	10 km (6.2 miles)
10GBase-T	RJ45	CAT 6a/7	Up to 100 m (328.08 ft)

Up to 500 km at 1 Gbps is supported when using a long distance transport system such as DWDM.

Memory specifications

The Brocade VDX 6720 has three types of memory devices: boot flash, compact flash, and main memory. The size of each is listed in Table 15.

TABLE 15 Brocade VDX 6720 memory specifications

Type	Size
Boot flash	4 MB
Compact flash	1 GB
Main memory (DDR2 SDRAM)	2 GB

Regulatory compliance

This section describes the regulatory compliance requirements for the Brocade VDX 6720.

- "FCC warning (US only)"
- "KCC statement (Republic of Korea)"
- "VCCI statement (Japan)"
- "Power cords (Japan Denan)"
- "BSMI statement (Taiwan)"
- "CE statement"
- "Canadian requirements"
- "China statement"
- "Laser compliance"

FCC warning (US only)

This equipment has been tested and complies with the limits for a Class A computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

Germany

Machine noise information regulation – 3. GPSGV, the highest sound pressure level value is 78.0 dB(A) in accordance with EN ISO 7779.

Maschinenlärminformations-Verordnung – 3 GPSGV, der höchste Schalldruckpegel beträgt 78.0 dB(A) gemäss EN ISO 7779.

KCC statement (Republic of Korea)

사용자 안내문 : A 급기기

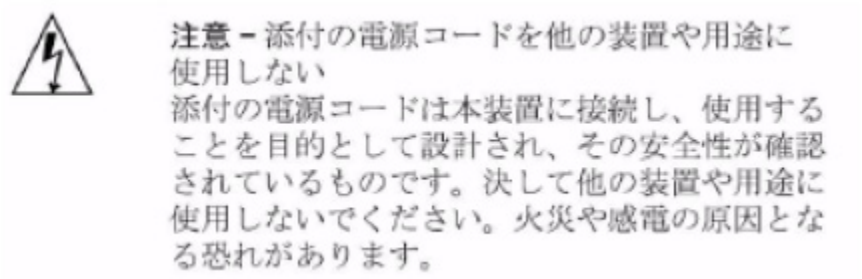
이 기기는 업무용으로 전자파 적합 등록을 받은 기기
이오니, 판매자 또는 사용자는 이점을 주의하시기
바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에
서 비업무용으로 교환하시기 바랍니다.

VCCI statement (Japan)

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance might arise. When such trouble occurs, the user might be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準
に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るように要求されることがあります。

Power cords (Japan Denan)



BSMI statement (Taiwan)

The BSMI Statement is applicable to Brocade VDX 6720 power supplies.

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，
在這種情況下，使用者會被要求採取某些適當的對策。

Warning:

This is Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

CE statement

ATTENTION
This is a Class A product. In a domestic environment, this product might cause radio interference, and the user might be required to take corrective measures

The standards compliance label on the Brocade VDX 6720 contains the CE mark which indicates that this system conforms to the provisions of the following European Council directives, laws, and standards:

- Electromagnetic Compatibility (EMC) Directive 2004/108/EEC
- Low Voltage Directive (LVD) 2006/95/EC
- EN50082-2/EN55024:1998 (European Immunity Requirements)
  - EN61000-3-2/JEIDA (European and Japanese Harmonics Spec)
  - EN61000-3-3

Canadian requirements

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations, ICES-003 Class A.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

China statement

China-CCC Warning statements

在维修的时候一定要断开所有电源 (English translation“disconnect all power sources before service”)

For non tropical use:

安全说明和标记	汉文	“仅适用于非热带气候条件下安全使用。”
	藏文	《ཉིན་གཅིག་ཏུ་ཚེས་གཉིས་ཀྱི་ནང་ཁ་ལ་ཉིན་གཅིག་ཏུ་ཡོད་པའི་ས་ཁུལ་ཏུ་ཡིན་ནོ།།》
	蒙古文	“ᠬᠦᠳᠠᠳᠠ᠋ᠰ᠋ᠤ᠋ᠯᠠᠭᠠ᠋ᠨ᠋ᠤ᠋ᠨ᠋ᠳ᠋ᠤ᠋ᠷᠠᠯ᠋ᠢᠶᠠᠨ᠋ᠤ᠋ᠭᠠᠳᠠᠭᠠᠽᠢᠶᠠ

Laser compliance

This equipment contains Class 1 laser products and complies with FDA Radiation Performance Standards, 21 CFR Subchapter I and the international laser safety standard IEC 825-2.

ATTENTION
Use only optical transceivers that are qualified by Brocade Communications Systems, Inc. and comply with the FDA Class 1 radiation performance requirements defined in 21 CFR Subchapter I, and with IEC 825-2. Optical products that do not comply with these standards might emit light that is hazardous to the eyes.

Electrical cautions

RTC battery

CAUTION

Do not attempt to replace the real-time clock (RTC) battery. There is danger of explosion if the battery is incorrectly replaced or disposed of. Contact your switch supplier if the real-time clock begins to lose time.

Electrical safety

CAUTION

This switch might have more than one power cord. To reduce the risk of electric shock, disconnect both power cords before servicing.

CAUTION

Connect the power cord only to a grounded outlet.

CAUTION

This product is designed for an IT power system with phase-to-phase voltage of 230V. After operation of the protective device, the equipment is still under voltage if it is connected to an IT power system.

DC-DC power source cautions

A caution calls your attention to a possible hazard that can damage equipment.

"Vorsicht" weist auf eine mögliche Beschädigung des Geräts hin. Sie finden die folgenden Vorsichtshinweise in diesem Handbuch.

Une mise en garde attire votre attention sur un risque possible d'endommagement de l'équipement. Ci-dessous, vous trouverez les mises en garde utilisées dans ce manuel.

Un mensaje de precaución le advierte sobre un posible peligro que pueda dañar el equipo. Las siguientes son precauciones utilizadas en este manual.

CAUTION	For a DC system (VDX 6710/6720/6730), use a grounding wire of at least 14 American Wire Gauge (AWG). The 14 AWG wire should be attached to an agency-approved crimp connector (provided on the VDX 6710/6720/6730 chassis), crimped with the proper tool. The crimp connector should allow for securement to both ground screws on the enclosure.
VORSICHT	Für ein Gleichstromsystem (VDX 6710/6720/6730) ist ein Erdleiter von mindestens 6 AWG (amerikanische Norm für Drahtquerschnitte) zu verwenden. Der 14-AWG-Leiter sollte an einem geprüften gecrimpten Anschluss (am VDX 6710/6720/6730 Chassis bereitgestellt) angebracht und mit dem vorschriftsmäßigen Werkzeug gecrimpt werden. Der gecrimpte Anschluss sollte eine Sicherung an beiden Erdungsschrauben am Gehäuse ermöglichen.
MISE EN GARDE	Pour un système à alimentation continue (VDX 6710/6720/6730), utiliser un câble de mise à la terre de calibre AWG 14 (2 mm^2) au minimum. Le conducteur de 2 mm^2 doit être fixé à un raccord à sertir agréé (directement présent sur le châssis du VDX 6710/6720/6730) à l'aide de la pince à sertir appropriée. Le raccord à sertir doit pouvoir être raccordé aux deux vis de mise à la terre du châssis.
PRECAUCIÓN	Para un sistema de CC (VDX 6710/6720/6730), utilice un conductor de tierra de al menos 14 CAE (Calibre de Alambre Estadounidense, American Wire Gauge 14 AWG en sus siglas en inglés). El conductor de 14 CAE debe estar acoplado a un conector rizado homologado (suministrado con el chasis VDX 6710/6720/6730), que haya sido rizado con la herramienta apropiada. El conector rizado debe permitir el acoplamiento a los dos tornillos de tierra del recinto.

CAUTION	For the DC input circuit to the system of a VDX 6710/6720/6730, make sure there is a UL-Listed 15 amp circuit breaker, minimum 48Vdc, double pole, on the input lugs to the power supply. The input wiring for connection to the product should be Listed copper wire, 14 AWG, marked VW-1, and rated minimum 90°C.
VORSICHT	Bei der Gleichstromeingangsschaltung zum System eines VDX 6710/6720/6730 muss sichergestellt werden, dass an den Eingangskabelschuhen zur Stromversorgung ein zweipoliger Schalter mit UL-Zulassung, 15 Ampere und mindestens 48 Vdc Gleichstrom vorhanden ist. Die Eingangsleitung zum Anschluss an das Produkt sollte als Kupferdraht, 8 AWG, angegeben, als VW-1 gekennzeichnet und für mindestens 90°C bemessen sein.
MISE EN GARDE	Pour le circuit d'alimentation en courant continu du système VDX 6710/6720/6730, vérifier la présence d'un disjoncteur bipolaire homologué de 15 A, minimum 48Vdc, sur l'entrée de l'alimentation. Les câbles d'alimentation du produit doivent être des fils de cuivre homologués de section 2 mm² (14 AWG), marqués VW-1 et testés à 90° C.
PRECAUCIÓN	Para el circuito de entrada de CC al sistema de un VDX 6710/6720/6730, verifique que existe un disyuntor catalogado por UL de 15 amperios, 48Vdc como mínimo, bipolar, en las orejetas de entrada a la fuente de alimentación. El cableado de entrada para la conexión al producto deberá ser de cable de cobre catalogado, 14AWG, marcado con VW-1, y tener una capacidad nominal mínima para 90°C.

DC power safety

CAUTION

All devices with DC power supplies are intended for installation in restricted access areas only. A restricted access area is where access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

CAUTION

For the DC input circuit, make sure there is a 15 amp circuit breaker, minimum 48Vdc, double pole, on the input to the power supply. The input wiring for connection to the product should be Listed copper wire, 14 AWG, marked VW-1, and rated minimum 90 C.

CAUTION

For a DC system, use a grounding wire of at least 14 American Wire Gauge (AWG). The 14 AWG wire should be attached to an agency-approved crimp connector (Tyco 34120 or certified Lug), crimped with the proper crimping tool and attached to the protective grounding lug, using a size #6-32 screw and a star washer, on the chassis with the other end to building ground. Each DC-DC power supply must have a separate grounding cable.

Regulatory certifications

Table 16 lists the regulatory compliance standards for which the Brocade VDX 6720 is certified.

TABLE 16 Regulatory compliance standards

Country	Standards		Agency certifications and markings	
	Safety	EMC	Safety	EMC
United States	Bi-Nat UL/CSA 60950-1 2nd Ed or latest	ANSI C63.4	cCSAus	FCC Class A and Statement
Canada	Bi-Nat UL/CSA 60950-1 2nd Ed or latest	ICES-003 Class A	cCSAus	ICES A and Statement
Japan		CISPR22 and JEIDA (Harmonics)		VCCI-A and Statement
European Union	EN60950-1 or latest	EN55022 and EN55024	TUV-GS	CE marking
Australia, New Zealand		EN55022 and CISPR22 or AS/NZS CISPR22		C-Tick mark
Argentina	IEC60950-1 or latest		“S” mark	
Russia	IEC60950-1 or latest	51318.22-99 and 51318.24.99 or latest	GOST mark	GOST mark
Korea		KN22 and KN24		KCC mark Class A
China	GB4943-2001 and GB9254-1998 or latest	GB17625.1-2003 or latest	CCC logo	CCC logo
Taiwan	CNS 14336(94) or latest	CNS 13438(95) or latest	BSMI mark	BSMI mark

Environmental regulation compliance

This section describes the “China RoHS” environmental regulatory compliance requirements for the Brocade VDX 6720 switch.

China RoHS

The contents included in this section are per the requirements of the People's Republic of China-Management Methods for Controlling Pollution by Electronic Information products.

遵守环境法规
中国 **RoHS**
本节中包含的内容都遵守了中华人民共和国《电子信息产品污染控制管理办法》的要求。

Environmental protection use period (EPUP) disclaimer

In no event do the EPUP logos shown on the product and FRUs alter or expand that warranty that Brocade provides with respect to its products as set forth in the applicable contract between Brocade and its customer. Brocade hereby disclaims all other warranties and representations with respect to the information contained on this CD including the implied warranties of merchantability, fitness for a particular purposes and non-infringement.

The EPUP assumes that the product will be used under normal conditions in accordance with the operating manual of the product.

环保使用期限 **(EPUP)** 免责声明：
EPUP 标志不会出现在产品和 FRU 的改装产品中，也不会对 Brocade 所提供的相关产品保修条款（该保修条款在 Brocade 及其客户间达成的适用合同中列出）进行增补。对于此 CD 上包含的相关信息，如适销性、针对特定用途的适用性和非侵权性的暗示保证，Brocade 在此郑重声明本公司对于与上述信息相关的所有其他保证和陈述概不负责。EPUP 假设在“产品操作手册”中注明的常规条件下使用该产品。

TS/HS dual language sheet

In accordance with China's Management Measures on the Control of Pollution caused by Electronic Information products (Decree No. 39 by the Ministry of Information Industry), the information in Table 17 is provided regarding the names and concentration level of Hazardous substances (HS) which may be contained in this product.

TABLE 17 China ROHS hazardous substances/toxic substances (HS/TS) concentration chart

Name of the component	Hazardous/Toxic Substance/Elements					
	Lead (PB)	Mercury (Hg)	Cadium (CD)	Hexavalent Chromium (CR6+)	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Ethernet Switch	X	O	O	O	O	O
Fan, Blower assemblies	X	O	O	O	O	O
PCBA cards	X	O	O	O	O	O
Power Supply kit	X	O	O	O	O	O
SFPs (SFP+ optical cable connectors)	X	O	O	O	O	O
Sheet Metal	X	O	O	O	O	O
Chassis Assembly	X	O	O	O	O	O
Mechanical brackets and Slides	X	O	O	O	O	O
Slot Filler	X	O	O	O	O	O
Cable management tray	X	O	O	O	O	O
Cable Comb	O	O	O	O	O	O
Cables and power cords	O	O	O	O	O	O
Replacement Doors	X	O	O	O	O	O
Software/ Documentation CDs	O	O	O	O	O	O

X indicates that the concentration of such hazardous/toxic substance in all the units of homogeneous material of such component is higher than the SJ/T11363-2006 Requirements for Concentration Limits.

O indicates that no such substances are used or that the concentration is within the aforementioned limits.

CHINA ROHS 有害物质/有毒物质(HS/TS)限量列表

有毒与有害物质或元素的名称及含量

根据中国的<<电子信息产品污染控制管理办法>> (信息产业部第 39 号令)，本公司提供以下有关产品中可能含有的有害物质(HS)的名称及含量水平的信息。

主要部件名称	有害/有毒物质或元素					
	铅（Pb）	汞（Hg）	镉（Cd）	六价铬（CR6+）	多溴联苯（PBB）	多溴二苯醚（PBDE）
光纤通道交换机	X	O	O	O	O	O
风扇/冷却组装件	X	O	O	O	O	O
线路板部件	X	O	O	O	O	O
USB 闪存器	O	O	O	O	O	O
电源	X	O	O	O	O	O
SFP（光纤接头）	X	O	O	O	O	O
钣金件	X	O	O	O	O	O
机箱部件	X	O	O	O	O	O
机械支架及滑轨	X	O	O	O	O	O
插槽填充物	X	O	O	O	O	O
电缆整理盘	X	O	O	O	O	O
梳状线缆	O	O	O	O	O	O
线束及电源线	O	O	O	O	O	O
替换门	X	O	O	O	O	O
软件/文档光盘	O	O	O	O	O	O

X 表示此类部件内同质材料中的有害/有毒含量高于 SJ/T11363-2006 的限量要求。

O 表示未使用此类物质或其含量低于上述限量要求。

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